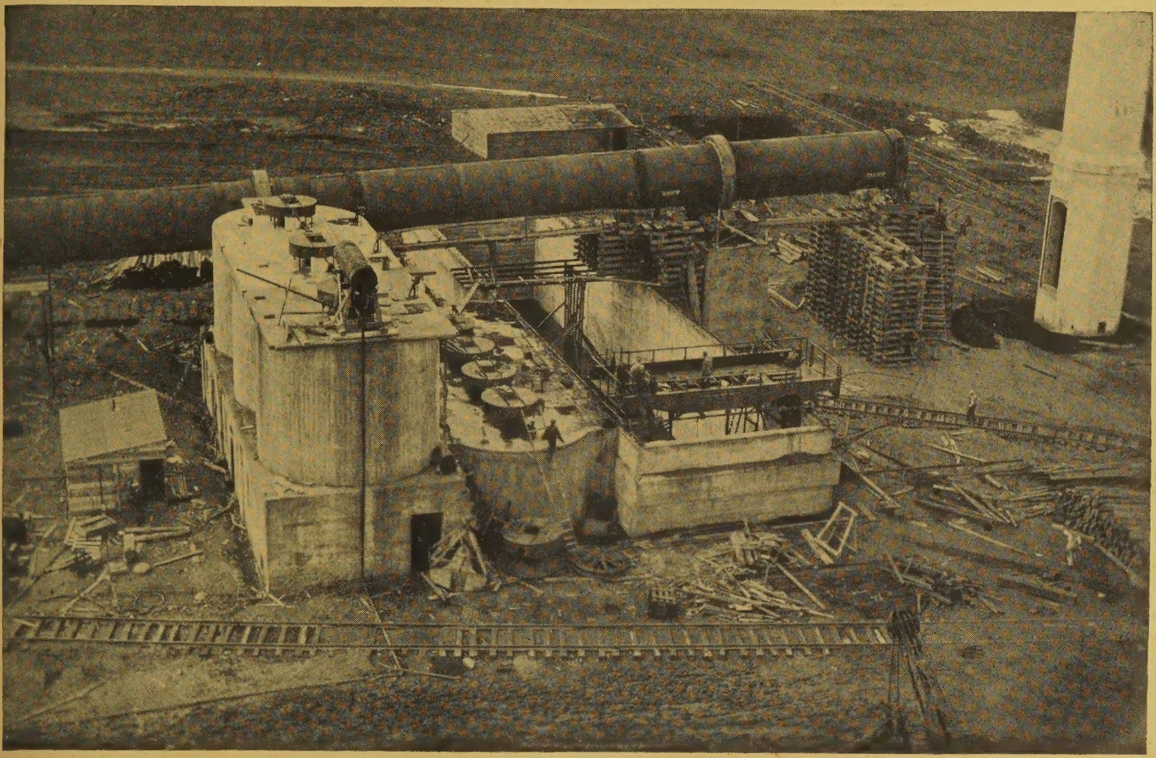
MILL SECTION of
Concrete

AGITATORS FOR CEMENT SLURRY



The illustration shows a typical installation of a SMIDTH agitating system for a one or two kiln wet process cement plant.

From the grinding machinery the slurry is delivered to the three-unit correcting basin. Each unit of the basin has a capacity of 600 barrels finished weight.

From the correcting basin, the material is tapped in the correct proportion and flows by gravity to the quadruple mix basin which holds about 2000 barrels. In this basin it should have the correct composition.

By means of a patented arrangement, the slurry passes, by bottom to top overflow, from the mix basin to the storage basin, which, in this case, is equipped with a traveling agitator. The basin illustrated holds slurry for 7500 barrels of cement.

The basins may be made of various sizes and placed differently in relation to each other than shown to suit the general arrangement of the plant.

The slurry is agitated mechanically and by means of air blown through nozzles located on the lower agitating arms.

Thorough mixing, complete chemical control, low horsepower consumption, low maintenance costs and large storage capacity, combined with utility of space are the advantages of the SMIDTH system.

F. L. Smidth & Co.
(Incorporated 1895)
ENGINEERS

225 Broadway
Designers and Equippers of Cement Making Factories
NEW YORK, N. Y.

Factory, Foundry and Laboratory—Elizabeth, N. J.

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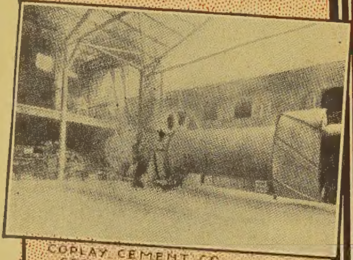
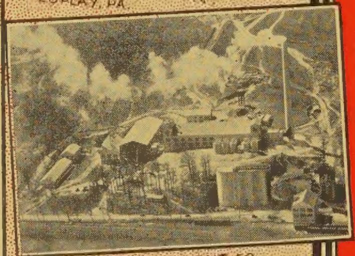
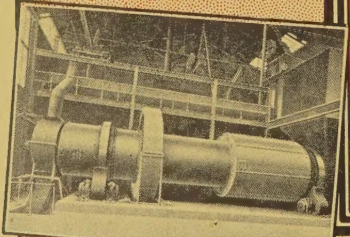
HOLDERBANK PORTLAND CEMENT CO., SWITZERLAND



COPLAY CEMENT CO., COPLAY, PA.



VALLEY FORGE CEMENT CO., CONSHOHOCKEN, PA.



ABERTHAW & RHOOSE PORTLAND CEMENT & LIME CO., LTD. CARDIFF, ENGLAND.

POLYSIUS EQUIPMENT
IN USE IN
CEMENT PLANTS
THROUGHOUT THE WORLD

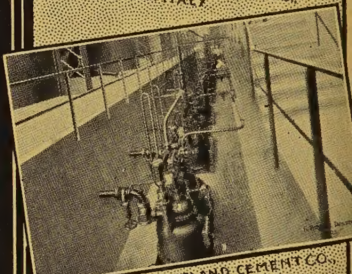
The supremacy and recognized leadership of Polysius Equipment is reflected in the installations in these plants scattered over the four corners of the globe.

The well known firms of Cramp Morris Industrials, Inc., Philadelphia and the Coatesville Boiler Works, Coatesville, Pa., collaborate in the building of Polysius Equipment.

Polysius Equipment in the New Plant of The Keystone Portland Cement Co., Bath, Penna. . . . .

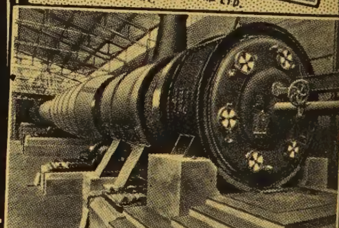
Polysius Corporation
Bethlehem, Pa., U. S. A.

ADRIATIC PORTLAND CEMENT CO., SALERNO, ITALY.

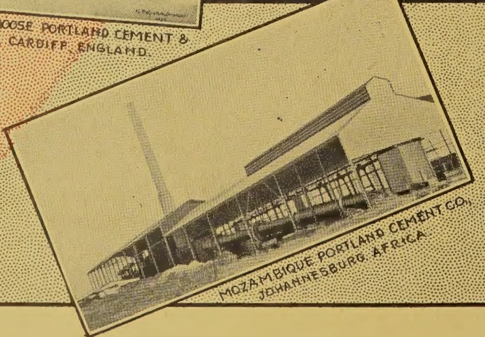


BEAUMONT PORTLAND CEMENT CO., BEAUMONT, FRANCE

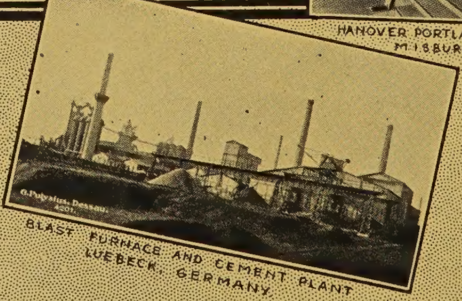
SHANGHAI PORTLAND CEMENT WORKS LTD. SHANGHAI, CHINA.



HANOVER PORTLAND CEMENT CO., MISBURG, GERMANY.



MOZAMBIQUE PORTLAND CEMENT CO., JOHANNESBURG, AFRICA



BLAST FURNACE AND CEMENT PLANT LUEBECK, GERMANY.

MILL SECTION of Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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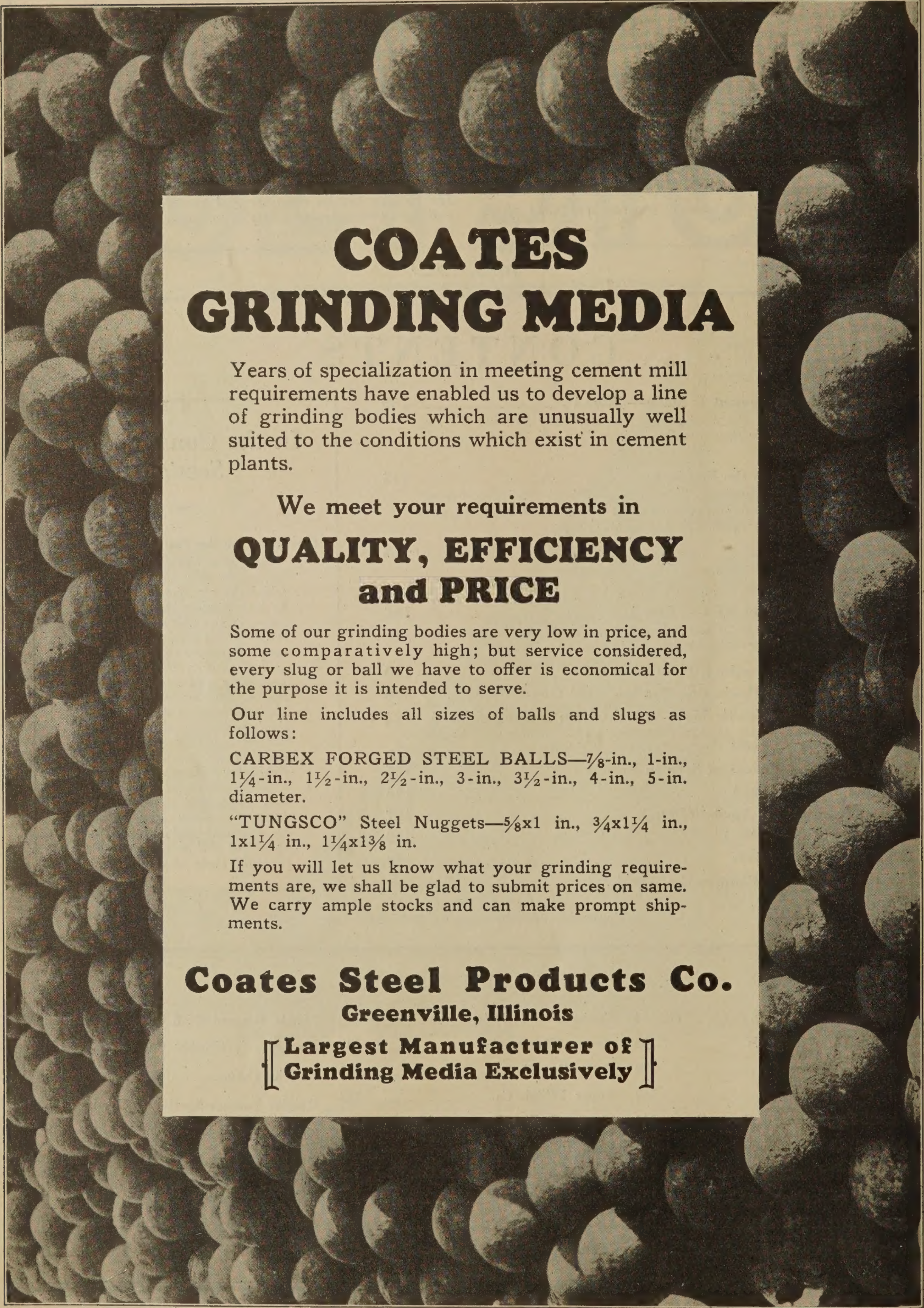


COATES GRINDING MEDIA

Years of specialization in meeting cement mill requirements have enabled us to develop a line of grinding bodies which are unusually well suited to the conditions which exist in cement plants.

We meet your requirements in

QUALITY, EFFICIENCY and PRICE

Some of our grinding bodies are very low in price, and some comparatively high; but service considered, every slug or ball we have to offer is economical for the purpose it is intended to serve.

Our line includes all sizes of balls and slugs as follows:

CARBEX FORGED STEEL BALLS—⅞-in., 1-in., 1¼-in., 1½-in., 2½-in., 3-in., 3½-in., 4-in., 5-in. diameter.

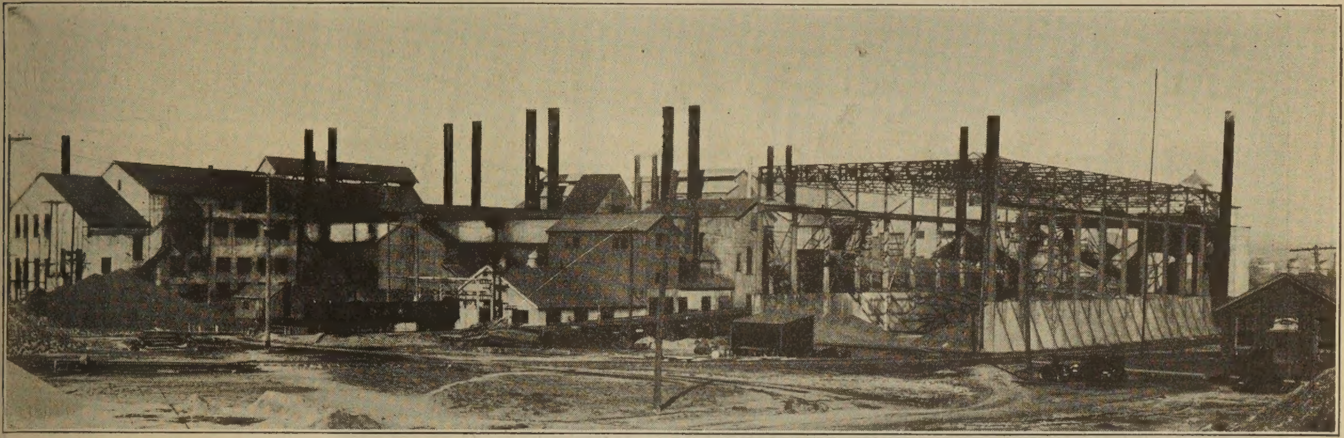
"TUNGSCO" Steel Nuggets—⅝x1 in., ¾x1¼ in., 1x1¼ in., 1¼x1⅜ in.

If you will let us know what your grinding requirements are, we shall be glad to submit prices on same. We carry ample stocks and can make prompt shipments.

Coates Steel Products Co.
Greenville, Illinois

Largest Manufacturer of Grinding Media Exclusively

MILL SECTION of
Concrete
Vol. 34 Chicago, June, 1929 No. 6



A panoramic view of the Kenova, Virginia, plant of the Basic Products Company, where "Green Bag" cement is produced

Where Green Bag Cement Is Made

A Description of the Cement Department of the Kenova, W. Va., Plant of the Basic Products Co.—Cement, Lime and Syndolag Manufactured—Plant Designed to Manufacture High Early Strength Portland Cement—Raw Materials Mined—Barge Line for Transporting Products

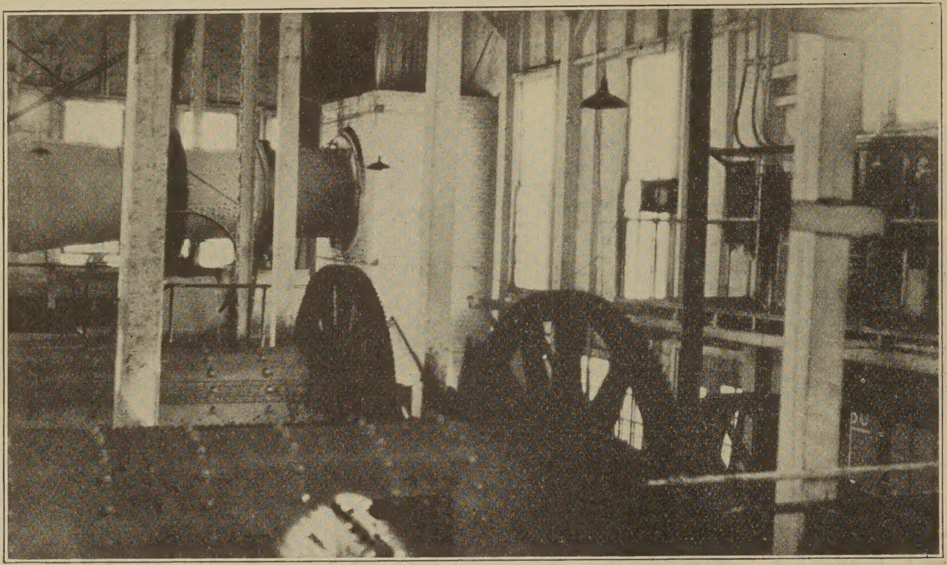
By L. N. BRYANT
Supervising Chemist, Basic Products Co., Pittsburgh, Pa.

WHEN designing its cement mill at Kenova, West Virginia, the first thought of the Basic Products Company was to produce a very high early strength portland cement. To produce a high early strength cement, the prime essential was to obtain suitable raw materials. A high quality limestone was selected from the Lawton, Kentucky, district, and suitable clay to add with this limestone was selected from the Princess, Kentucky, district. The next step was to process these materials properly and equipment was selected and installed to attain this objective. On May 9th, 1927, the mill was placed in operation, and the manufacturing of Green Bag cement was established.

This mill is unique in that the cement department is interwoven with the departments manufacturing lime and a patented refractory product known in the steel industry as Syndolag, proving the feasibility of producing a variety of products under the same roof.

The limestone used is of the Mississippian formation, designated in the Kentucky Geological Survey reports as the "Sub-Carboniferous Limestone," and the clay is of the plastic Number Two Kentucky Fire-Clay group. The method of drift mining is used to obtain these materials. This method is very unusual in the cement industry, but it has the advantages of eliminating stripping, producing uniform materials free from overburden, and assuring uninterrupted operation during all seasons of the year. At the Lawton mine the limestone receives the preliminary crushing by means of an Allis-Chalmers gyratory crusher, from which it is delivered to a large steel loading bin by a belt conveyor system. Both limestone and clay are delivered to the mill in standard hopper-bottom cars, and discharged into reinforced concrete storage bins, or added to the stockpiles.

From the storage bins, the limestone is delivered by belt conveyor to the secondary crusher, an American Pulverizer Company ring-roll mill, and further reduced to the proper size for the wet grinding mill feed. The clay is weighed from the bins and delivered to an Allis-Chalmers clay wash mill, and at this point all of the water necessary for the slurry is added. When properly agitated, the clay slip is discharged into a concrete storage sump, then transported to the wet grinding mills by means of a Wilfley pump system which provides constant circulation by returning the surplus slip to the storage sump. Two Allis-Chalmers compeb mills are used for grinding the slurry which is discharged into a reinforced concrete sump. From the slurry sump the finished material is pumped by means of a Wilfley pump system into the large steel correction tanks. Air and mechanical systems are used for agitation which insures perfect mixing and blending. Chemical analysis of each tank of slurry is made, and the proper proportions pumped to the kiln feed storage tanks which are also equipped with air and mechanical agitation systems. From these tanks the slurry is pumped to the Ferris-wheel feeders at the feed ends of the kilns.



View of the coal mill, showing two of the compeb mills, with indirect fired dryer in the background

Kiln Department

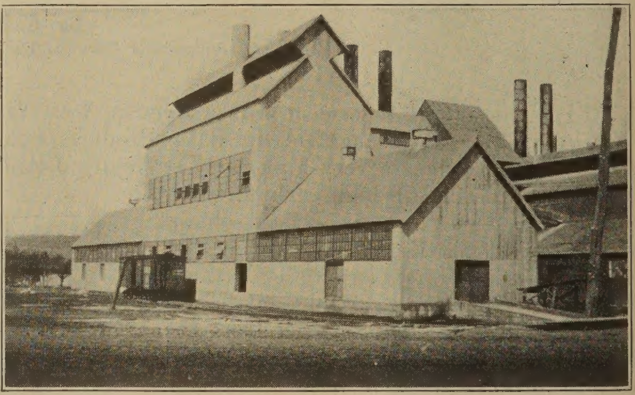
The feed systems to the kilns are so arranged that cement, lime, or Syndolag may be burned in any of them. There are four kilns for burning cement, all of Allis-Chalmers design. A very high grade West Virginia coal, ground in the three Allis-Chalmers compeb mills, is used for firing the kilns. The clinker is cooled in rotary coolers, also of Allis-Chalmers design, and transported by means of bucket elevators and belt conveyors to the 150,000 bbl. clinker storage. Very skillful operators are necessary on these kilns, due to the variety of materials handled.

Finish Grinding Department

The clinker is retained in storage until the proper analysis and tests are made, then separate runs are blended by means of an overhead crane and delivered to the steel bins over the finish grinding mills. Two Allis-Chalmers compeb mills are used for grinding the clinker. Gypsum is added to the clinker at the mills by means of ingenious automatic feeders designed by the Basic Products Company. These feeders give excellent service and can be so regulated that any specified gypsum content may be maintained constantly. From the finish grinding mills, the cement is conveyed by bucket elevators and screw conveyors to the ten reinforced concrete silo storage bins. A cyclone dust collecting system is operated in conjunction with the mill to afford the necessary draft and to collect the inevitable dust produced.

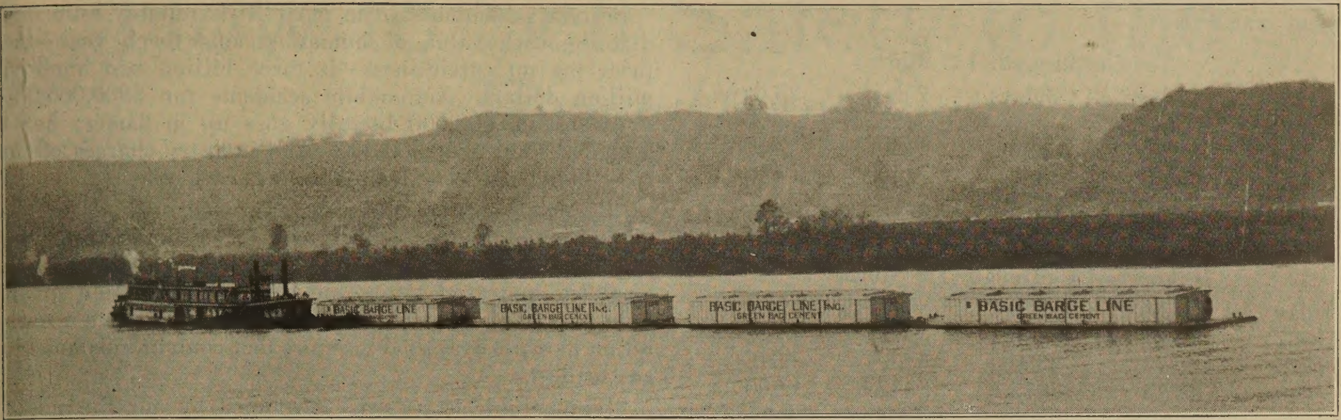
Bagging and Shipping

Underneath the silos is a system for blending the cement when desired, but to date, blending has been found unnecessary, due to the rigid plant control system followed in the earlier stages of the process. Between the two batteries of five silos each, are the pack house, bag cleaning, and bag storage departments. Two Bates valve bag packing machines are used for bagging the cement. From the pack house, the cement is loaded into railroad cars and trucks, or loaded into barges for shipment via the Ohio River.

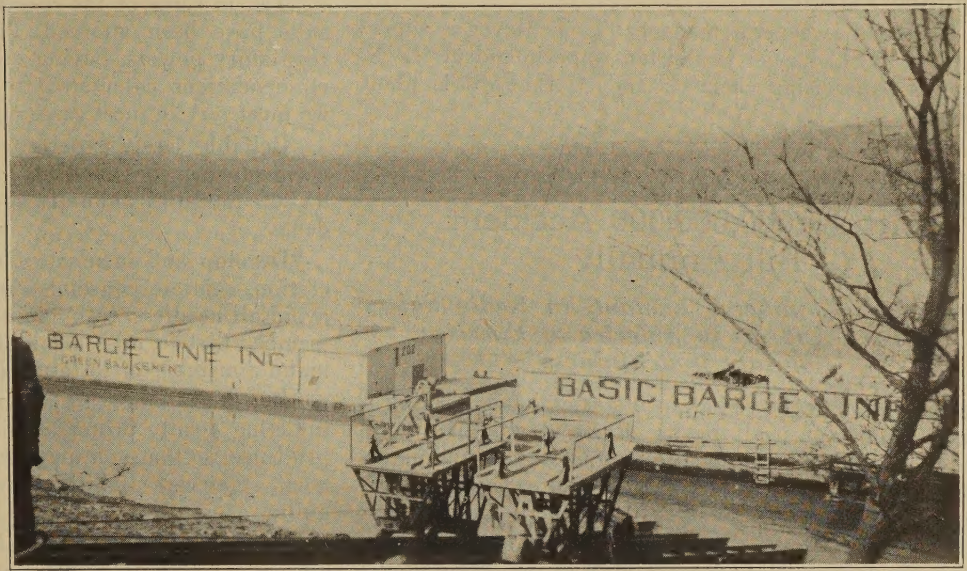


A view of the hydrating plant for lime

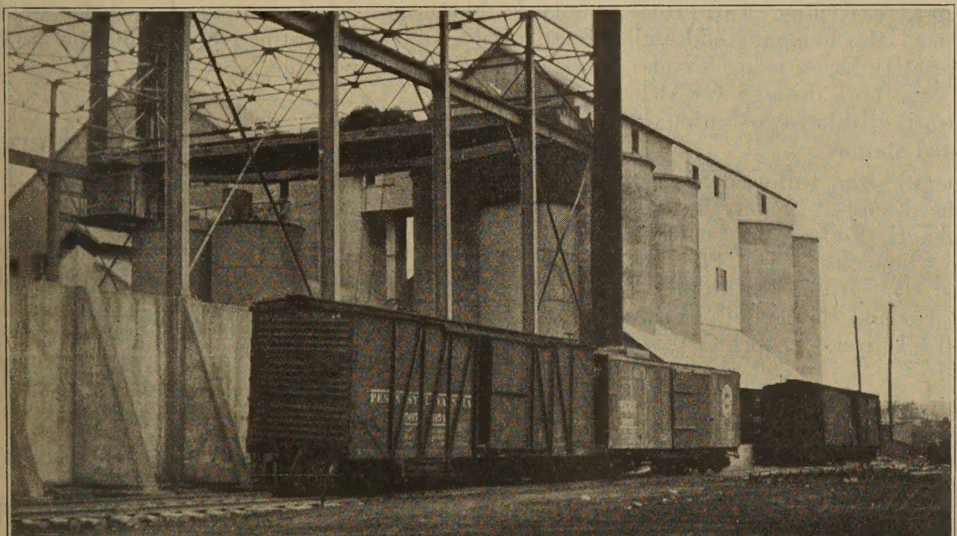
Being situated in the industrious Tri-State region, the facilities for trucking are excellent with ideal railroad connections with the Chesapeake and Ohio, Norfolk and Western, and Baltimore and Ohio railway systems. The Basic Barge Line Inc. supplies accommodations for river



Fleet of loaded barges bound up the Ohio river for Pittsburgh



A view of the barge loading dock with loading skips in the foreground



Silo storage at the Kenova plant, with clinker storage at the left

traffic with large all-steel barges, which are loaded right at the back door of the mill on the Ohio River.

The adoption of the green bag with red lettering, a radical innovation in the cement industry, has proven successful and is popularly accepted by the trade.

The following physical tests of the cement, made by a reputable commercial laboratory, prove the success of the venture into the field of high early strength portland cement manufacture.

Tensile Strength 1:3 Mortar

1 day	2 days	3 days	7 days	28 days
220	265	350	425	450
235	250	325	450	465
240	260	330	440	480
232	258	335	438	465

Compressive Strength 1:3 Mortar

1 day	2 days	3 days	7 days	28 days
1687	2840	3750	5375	6625
1775	2775	3850	5450	6875
1800	2725	3875	5337	6900
1754	2780	3825	5387	6767

Operating Personnel

A. T. Wood is general manager; E. J. Meyer is superintendent; W. L. Lasher is assistant superintendent; L. N. Bryant is supervising chemist; and A. E. Ford is plant chemist.

Industry Shown to Lead Other Fields with $1,000,000,000 Accident Bill Annually

Secretary of Commerce Lamont, in Radio Safety Address, Appeals to America to Exercise Constant Watchfulness

As individuals comprising an industry that is making a foremost name for itself by its efforts to eliminate accidents, those engaged in cement manufacture are finding an interest close to home in the series of thirteen radio addresses being delivered weekly by as many famous men and women.

The part that Uncle Sam is playing in the safety movement in America was discussed by Hon. Robert Lamont, Secretary of Commerce, on Saturday evening, May 11th, 7:15 eastern daylight saving time. Mr. Lamont's address was the fourth in the Universal Safety Series being broadcast weekly on Saturdays from New York through WEAF, with which is hooked up a network of thirty-two National Broadcasting Company associated stations.

Madam Schumann-Heink, operatic star, followed Secretary Lamont, on May 18th. She discussed "Safety in the Home." On May 25th, Dr. John H. Finly, editor of the "New York Times," talked on "Education—The Part It Plays in Safety." On June 1st, Dr. Miller McClintock, director of the Albert Russell Erskine Bureau of Street and Highway Research, Harvard University, was to discuss "Making Our Highways Safe."

The balance of the program scheduled is as follows:

June 8th, Grover A. Whalen, New York commissioner of police, "Enforcement as an Aid to Safety."

June 15th, Alfred H. Swayne, vice-president, General Motors, "The Automobile and Safety."

June 22nd, Harry F. Guggenheim, of the Guggenheim Fund for the Promotion of Aeronautics, "Safety in the Air."

June 29th, Joseph E. Sheedy, executive vice-president U. S. Lines, "Safety on the High Seas."

July 6th, Honorable James J. Davis, Secretary of Labor, "Safety and the Worker."

July 13th, A general summarization of the entire safety problem as it confronts America. Speaker to be announced.

Secretary Lamont said in part, "It is reliably estimate that the cash value of human sacrifice each year—th price tag on carelessness—is three billion two hundre million dollars. Automobile accidents run $800,000,00 a year; $550,000,000 literally goes up in flames; hom tragedies total $850,000,000. And industry charges off i red—blood red—one billion dollars each year.

"By demonstrating the most approved methods of obviating mine disasters (which have taken a tragic toll) th Bureau of Mines has aroused and strengthened the movement for increased safety and accident prevention in al industries. The Bureau's efforts have brought about a revolution in explosives used in mines that contain inflammabl gas or dust.

"Innumerable 'standards' developed by our Bureau o Standards bear directly on the furtherance of industria and traffic safety.

"Yet, in some of the specific fields where gratifying results have been attained, the government lacks definit regulatory powers, having no authority to enforce its recommendations calculated to promote safety. Ultimately we must rely in most cases on the individual.

"Reliable safety experts tell us that 98 per cent of al accidents can be avoided. That's why we say that th 95,000 fatalities annually are caused by 'so-called' accidents.

"Develop and inculcate Care! Resolve to exercise discretion, caution, constant watchfulness. Train yourself t avoid all heedless, rash exposure to unnecessary risks. Remember that to miss a minute is infinitely better than t maim a member or to lose a life.

"If you are operating any mechanism that is capable o inflicting deadly injury, cultivate consistent vigilance and prudence, so that you may escape all troublesome involvement, material liability, ineffaceable consciousness o guilt.

"And, in addition, I appeal to you to ally yourself with all such forces, all such organizations, as are working publicly and co-operatively for Safety. Adhere to the standards they establish. Spread the knowledge of their efforts. Make your own distinctive contribution to their work wherever that is possible."

Czechoslovakian Cement Mills Report Good Year

The annual report of the Czech cement firm, Fabrique de Ciment de Kraluv Dvur, shows a net profit of 24,500,000 Kc. ($735,000) for the year just closed. After a dividend of 100 Kc. ($3.00) per share has been distributed, 605,000 Kc. ($181,500) will be added to the reserve funds. Sales for the first months of the current year are reported far in excess of those of the same period last year. It is proposed to increase the capital from 40,000,000 to 48,000,000 Kc. ($1,200,000 to $1,440,000).

European Cement Mills Form Syndicate for Exportation

Through the efforts of Norwegian interests there has been formed, at Copenhagen, a syndicate of European cement producers which will handle cement exports of the mills concerned. In the syndicate are German, Norwegian, Swedish, English and Belgian mills representing an annual production of 50,000,000 bbls. The syndicate will concentrate on cement exportation to the South American countries.

How to Sell Safety to the Employe

Worker Active in Promotion of Safety Tells How to Build Ground Work — Necessity for Application of Fundamental Selling Rules—Part Foremen Should Play in Carrying Out Accident Prevention Plans

By A. R. COUCHMAN
Safety Director, North American Cement Corporation, Albany, N. Y.

ANY number of theories have been propounded as to how safety can, or should, be "sold" to the plant employes. I believe the differences of opinions on this subject are due mostly to local conditions, which are affected by the different types of individuals that are employed. Those that have been actively engaged in safety work have learned that the human element is rather a delicate problem to handle, especially in organizations where many types of individuals are found. Some industries have been successful in eliminating accidents by a certain procedure, while others have been successful along other lines.

Clarified Presentation Necessary

From past experience, I believe the majority of us will agree that the success of any organization, with regard to safety, is through educational efforts. Success, however, in this connection depends entirely upon the methods pursued in applying this education. When an article or service is being sold and before the sale is consummated the prospect must be convinced or educated to think as you do. It is, therefore, essentially important that we think right before we try to sell the employe or we may sell him on the wrong idea.

When we speak of selling safety we must not lose sight of the fact that after all it is only a form of education. I think if we were to check our past performances, we would find many instances where the employe has been wrongly sold; he has not been made to understand just what it is all about.

Perfect Record Is Problem

I think it is possible to build up a successful safety organization, even to the point where accidents can be practically eliminated. Selling safety is the first step toward this end. The cement industry as a whole has made wonderful strides in accident prevention. Our big problem, however, remains to be solved and that is how to keep up a perfect record after once acquiring it.

It has been said that labor turnover has been one of the chief causes. I am inclined to believe that labor turnover does not enter into it to any great extent. I recently went over the records for several mills and found that 85 per cent of all accidents occurred to men that were employed one year or more, and in some cases as the service record of certain individuals increased, their accident frequency also increased. I have also heard it said that we must have a certain amount of good luck, along with our safety activities, to get anywhere. I think all of us have had good luck but we have failed to look upon it in the nature of a warning.

To successfully sell safety to an organization we must have properly trained foremen. They hold the secret of getting it across. However, we cannot expect all our foremen to be the type to put safety across as it should be. It is necessary to train our foremen and sell them on safety. Some foremen are natural leaders and need very little training.

Within the next decade we will have learned that accidents can be scientifically controlled and we are going to find ourselves budgeting production with accident control. The foreman who has taken this viewpoint and feels that he is morally responsible for his men is going to be successful in controlling department accidents.

Duty of Foremen

He should start every man, especially new men, on jobs fully familiar with what is and is not the right and safe method of work; and see that they are familiar with such hazards as cannot be guarded. He should check up his men daily and make sure that his instructions are being carried out. He should see that attention is given to existing safety rules.

Roger Babson has said that only one man in fifty ever thinks; only one in five hundred ever originates anything. If this is true I wonder how many of these men we have in our organizations.

I have been told that 4 per cent of the population of America are idiotic and chaotic, 40 per cent subnormal, 40 per cent normal, 14 per cent intelligent and 4 per cent executive. Let us assume that our organizations are made up of certain percentages of these different types; excluding the idiotic and chaotic type. If this is true, you have four major types of individuals to deal with, any one type of which could be segregated into any number of types, which is essential in placing men on different jobs. However, from a safety viewpoint only the major types need be recognized.

The first thing to be taken into consideration, in dealing with the different types, is to form a plan of procedure that will reach your lowest type employes. I hesitate to say that they are in the subnormal class, but to a very great extent you will find many of them mentally deficient, when it comes to understanding the ifs and whys of safety. This type of employe is hard to sell because it does not understand or realize the value of safety. In most cases this type is injured not through carelessness but through thoughtlessness. We find some of the more intelligent types are injured through carelessness; their thinking

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Paper presented before regional safety meeting of the Portland Cement Association at Washington, D. C., on April 2nd.

powers are developed but they lack interest. To develop the employes' thinking we must reach their subjective mind. Some men act only by the objective mind. If you are talking with them on safety the chances are it only goes as far as the objective brain cells.

For instance, you have three men, each of a different type, and you are to sell them on eye protection. We will say that Tom Brown is the lowest type, Sam Jones the medium type, and Bill Smith the highest type. You call them in one at a time, starting with Smith. You say, "Smith, we are having a lot of eye accidents and we have come to the conclusion that it will be necessary, under certain conditions, for our employes to wear goggles." Smith replies, "That is a fine idea; I have goggles and always wear them on hazardous jobs." Why did Smith wear goggles? Because, he was the type of man that understood and his thinking powers were fully developed. You next call in Jones and tell him the same story. Jones replies that he thinks it a good idea but he forgets to use his goggles occasionally. "Why?" Because he has taken the viewpoint of eye protection carelessly. You will next call in Brown, and you give him the same story. Brown has never worn goggles and he immediately replies, "I can't work in goggles. I can't see through them. They steam up." He finally says he will try them out; and if it is dropped there, that is as far as it goes. If this attitude would apply to your whole organization, then approximately 50 per cent of your employes are disregarding eye protection.

A plan of procedure must be followed that will take in each employe in the plant. In forming this plan we must first take into consideration our lowest type employe. If our method of procedure takes in this type of individual we need not worry about the rest of our organization; on the other hand, if you sell the higher types and do not reach the lower types then you can expect a perfectly good safety record to be unexpectedly upset. The permanent success of any organization, relative to safety, depends entirely upon the basic methods used in selling or educating the individual employe.

There are five factors, as I see them, in selling safety to the employes. They are, approach, attention, interest, conviction and desire.

Approach

I will not attempt to suggest how you should approach the employe on safety. However, every man should be reached either verbally or otherwise. The factors of selling following approach are the most important.

Following approach you must command attention. To claim attention you must get the employe to think, to concentrate on the things you are trying to put across. To do this effectively it is necessary to have a rule on certain major hazards and unsafe practices with a reasonable penalty attached for breaking it.

Interest

The next important step is to create interest. You may say after complying with certain rules that the employe will not become interested. But the fact remains that he will, and you will be surprised to note the precautions he will take not only in trying to prevent personal injuries but to protect fellow employes as well.

To maintain interest it is necessary to have some form of competition and possibly recognition on the part of certain individuals who have shown unusual interest toward the advancement of safety. I think it unwise to offer cash prizes because it establishes a precedent that may prove embarrassing in the future. One of the ideal ways of creating interest is through plant accident records. First, the records should be complete. To do this it is necessary to have all injuries reported regardless of their nature, not only to the foreman but someone else designated for that purpose. It has been said that it is impossible to have all minor injuries reported. There may be some exceptions but I think it can be done.

Sometime prior to January 1, 1929, we called in all our foremen and told them of our plans for the ensuing year. Among some of the things we wanted to put across was the reporting of all injuries. Having been assured that we would get the whole-hearted support of our foremen, we issued a definite rule in this connection. As a result of this rule we believe we are having all minor injuries reported and our records show that they have increased 50 per cent. While our accident frequency is higher, the increase has come about by having men report small injuries that they were not in the habit of reporting heretofore.

You may wonder how reporting such injuries would have a tendency to create interest in selling safety. First of all the first aid men should be familiar with all phases of plant work. When a man comes in for first aid he will be in a position to ascertain whether or not a preventive can be recommended against a future occurrence. You will find as these men report, especially those that have to come in most often, they will become interested in trying to prevent future occurrences; it starts them to thinking. For instance, two men are doing the same work, using the same kind of tools. Suppose the one should have several small injuries; probably to the employee they would seem insignificant and unless forced to, he would not report them and probably not give them a thought. But if each of these injuries were reported, by the time the third was reported that man would be figuring how or why he was having these injuries when the other fellow doing the same work was not.

Another way of creating interest through the plant records is to classify all accidents, designating the type, cause, part of body affected and department accident occurred in. Select the type of accidents you are having the most of and put on a special drive to reduce or eliminate this particular type.

Conviction

The fourth factor of selling safety is conviction. This is made possible in some cases by the reaction from the effects of the first three factors. However, sometimes it does not work out this way. We may have some employes who have become interested in safety but are not concerned or convinced of the real benefits derived therefrom. In this connection, however, time will adjust unusual cases.

Desire

The fifth and last factor in selling safety is desire. Some employes can be sold 100 per cent on the other four factors, and yet do not have the desire. It is easier to sell employes safety than it is to keep them sold. We, therefore, can not afford to pass up a single day without checking up on unsafe practices and speaking to someone about safety. It does not matter how well we have our employes sold, occasionally we find someone unconsciously—not carelessly—performing unsafe practices. When you have reached this stage of safety you have the constructive part of your program to perform; and that is linking safety first with accident prevention.

We must follow up daily the reaction of different men on the same job. Too often we think only of safety first and forget about accident prevention.

After all the whole secret of accident prevention lies within the control of supervisory methods properly applied and enforced by just discipline.

EDITORIAL

A New Cement Standard

RECENT developments in the field of cement specifications indicate that it is not unlikely that a new specification covering high early strength cement may be expected.

Such developments were inevitable. Even as far back as several years ago users of cement were buying on the basis of early strength. During the last year the question reached a point where definite, constructive action could not be ignored. The subject was one that was of first importance both to users and to manufacturers of cement. It was discussed wherever men in any branch of the concrete industry met and the editorial columns of this magazine have urged the formulation of such a specification at intervals during the past two years.

Considered either from the standpoint of the user or of the manufacturer, a standard specification covering high early strength must be adopted. It is no longer possible to serve the industry with only the present standard specification. The attempt to do so during the past year or two has led to difficulties. Users who wanted high early strength wrote their own specifications, each working independently of the others. The result was a vast array of different requirements and the cement manufacturer was expected to meet them all if he wanted the business.

The plain facts are that, as far as the cement manufacturer is concerned, there are a great many different specifications now in force. The adoption of another or even two more standard specifications would actually decrease the number of specifications the manufacturer is required to meet.

Users of cement have become accustomed to the use of standard specifications. They prefer to use them rather than to write their own. But the standard specifications must cover *all* the qualities they demand. In the case of high early strength, the user has no choice but to write his own specifications. A new standard, covering these new additional requirements, will relieve the user of this need and will again bring the benefits of standardization to the ndustry.

It has been said that another standard specification would work hardship on the cement manufacturer because it would necessitate additional silo capacity. But is that hardship not accentuated with conditions as they are now? The manufacturer who sells cement to several states, several counties and several municipalities, each of which has its own specificaions, must now set aside reserved storage capacity for all of these buyers separately. Surely that is not securing the advantages of standardization!

Standardization has contributed much to the development of the cement industry in the United States. It has been of equal value to the user and the manufacturer. Surely this outstanding advantage should be retained. But to retain it it is necessary to take into account the new developments that have taken place. Standardization must move forward with these new developments or it will harm rather than benefit the industry. Changing conditions force new standards.

When Committee C-1 of the American Society for Testing Materials meets this month at Atlantic City, it will have an unusual opportunity to render a constructive service both to cement manufacturers and to cement users by recommending the adoption of a new tentative standard specification for high early strength cement. That is the only constructive course the committee can take. The problem is squarely before it and it must be met. Delay will only unnecessarily continue an unsatisfactory condition.

All Together Now!

WHEN this issue reaches you, the June No-Accident Campaign will be under way. In practically every plant on the continent officials and workmen will be striving to set a new record in accident prevention. The "big push" will be on!

Success in any undertaking is largely a matter of mental attitude. If you are convinced that a thing can be done, the chances are that it ***will*** be done. Certainly, the conditions for making a perfect record this year are much more favorable than they were last year. Response to enrollments has been more enthusiastic than in previous June campaigns and preparation has been more thorough than ever before.

Every sign points to a new record. Even perfection is possible. There are thirty days in June and during each one of these enthusiasm must be maintained at as high a pitch as now at the very beginning. Plant and general office officials can help immeasurably by giving words of encouragement and by taking a personal active interest in maintaining enthusiasm. To make this record every company employee must co-operate. It is a tremendous undertaking and can succeed only if everybody pulls together.

Selection of a Cement Kiln

Some of the Factors That Influence Rotary Kiln Performance—Economy of Operation—Kiln Research—Influence of Raw Materials on Kiln Output

By HARRY STEHMANN

THE most important process in the cement industry, the calcination of cement, takes place in kilns of various types and shapes. Some manufacturers advocate a maximum length of kiln, while others stress a maximum kiln diameter. An enlarged burning zone vies for popularity with an enlarged calcination zone. It is quite certain that the type of kiln is bound to be of influence in the manufacturing process. In judging the value of a certain kiln, one must, therefore, distinguish between adequacy and resulting economy of operation.

Economy of Operation

The economy of a kiln is broadly defined as the difference between all factors representing the input and the output produced. A kiln most economical from this standpoint is not necessarily the best suited for any individual case. In a location where an unlimited demand for cement and relatively low cost of fuel prevail, it is of minor importance, whether 50 W. E. (Warmeeinheit—1 k.-cal., approximately equal to 4 B.t.u.) more or less is used per kg. clinker. Preference should be given to a kiln which will yield a maximum output under reasonably normal conditions of heat consumption. In other localities, where the supply of cement is already nearly sufficient to cover the existing demand, or where fuel costs are high, as may be the case due to freight charges, the controlling consideration will be that of a kiln with lowest fuel costs capable of producing a fixed quantity of cement within a given time limit. It is important in such cases to select a kiln permitting the use of cheap grades of coal, regardless of the heat value.

In recent times another viewpoint is added to the above considerations. What kiln, due to properties inherent in its design, is best able to furnish a guarantee of a high test product, conforming to the highest requirements?

The comparison of the cost of installation of different kilns requires no explanation.

In dealing with the improvement of an existing kiln, it is of interest to establish the expenditures involved by the progress expected in each individual case. It is necessary to determine whether difficult or time consuming alterations are to be faced and whether the available space is adequate to accommodate the new additions.

Kiln Research

Considering the important part played by the calcination process in the cement industry, it is evident why an effort is being made to establish on the basis of impartial evidence the advantages and disadvantages of different kiln designs and shapes. These problems have frequently been made the subject of theoretical discussions. The results of the latter, however, must be supplemented by

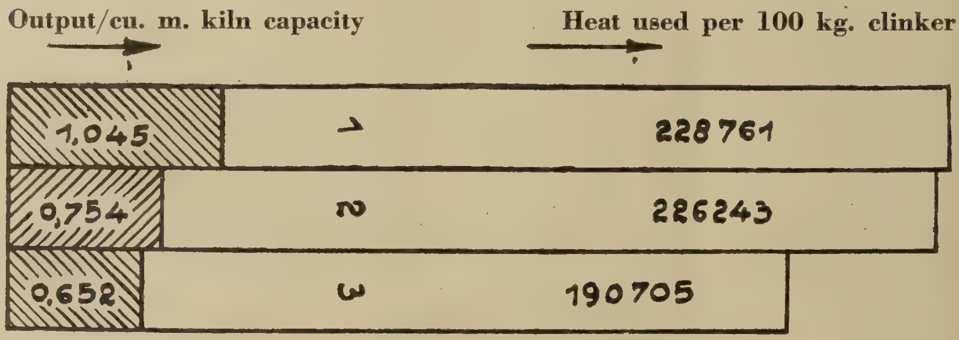


Figure 1

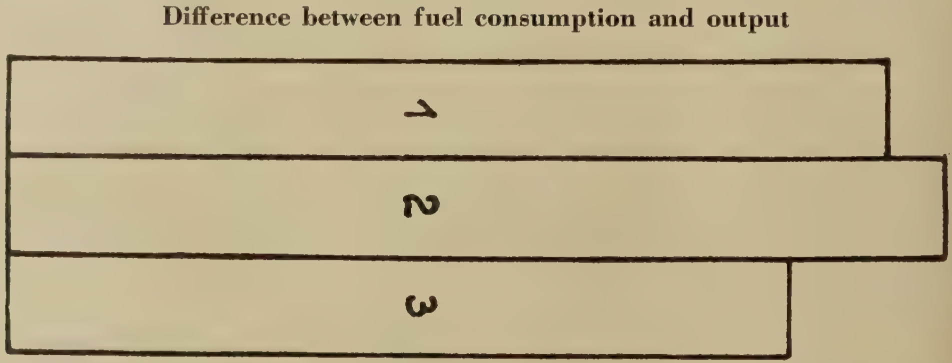


Figure 2

practical test evidence to serve the purpose. The author believes that he is not mistaken when he assumes that these were the considerations which prompted the German Association of Portland Cement Manufacturers to appoint a committee which is to investigate the kilns operating in different plants. According to the report of the Kiln Committee published in No. 32 of "Zement" during the past year, 11 kilns have been investigated thus far. In this report as well as in previous publications is found the description of the construction of the kiln, giving outside dimensions. It is also the purpose of the investigation to indicate the method of weighing clinker and coal, the nature of temperature measurements, etc. The results of the investigations, compiled in tables, are considered to be of importance.

However, a compilation of figures representing the established output and the consumed heat units, cannot furnish a complete solution of those problems, which are involved in judging the advantages and disadvantages of a kiln type, i. e., in the valuation of its adequacy in a given installation. Aside from this, tabulated numerical values, which naturally invite comparison, are acceptable only when the same assumptions form the basis of all values. Tables 1 and 2 of the report mentioned above, however, list data of shaft kilns and rotary kilns, kilns operated by the dry and the wet process, those provided with waste heat boilers side by side with others with no such installations.

Raw Materials Influence Output

It is familiar that the properties of the raw materials have an important effect on the kiln output and the required heat consumption. In some cases the solution of silica proceeds easily, while in others it requires considerable heat and much time. The required sintering temperature is strongly affected by such conditions. This is demonstrated by the fact that rotary kilns of identical design, both using the wet process, may require from 190,000 WE to 240,000 WE per 100 kg. clinker. For example, it is quite clear that one rotary kiln may show a good output because the burning of slag sand is easier than—for instance—the sintering of a raw material with not easily soluble silica, regardless of the lower carbonate content. The factors affecting the heat economy of a shaft kiln are so different from those of a rotary kiln, that it is the author's opinion that no accurate results can be drawn from such a comparison. A rotary kiln, operating by the wet process, receives a slurry containing 40 per cent water, so that about 1 kg. water must be driven off per kg. clinker. Thus, judging from the cu.m. kiln capacity alone, a kiln using the dry process must naturally yield a higher output than one receiving the slurry. Due to the fundamental differences in the working conditions of the kilns investigated by the kiln committee, errors can easily creep in in judging the relative merits of different kilns, when compared entirely on the basis of output.

Rotary Kiln Output

Among the kilns investigated by the kiln committee, a rotary kiln provided with the author's calcination system and operated by the wet process, is listed with an output of 0.652 cu. m. kiln capacity. To illustrate the difference in results which may be obtained in compiling a table or other statistical data, according to the viewpoint on which such a compilation is based, the following deductions are offered, illustrated by two diagrams.

Assuming that only kilns operating under similar working conditions can yield a fair comparison, the author selected (see diagrams) only three rotary kilns, using the wet process, from among those investigated by the kiln committee. The three kilns are designated as 1, 2 and 3 in Fig. 1 and 2. Kiln 3 represents the kiln provided with the Stehmann system. Fig. 1 shows that kiln 3 has the lowest fuel consumption with 190,705 WE per 100 kg. clinker. The cross hatched areas in Fig. 1 indicate the output per cu.m kiln capacity. Kiln 3 has the lowest capacity with 0.652 t. per cu.m. Fig. 2, developed from Fig. 1, shows the difference between fuel consumption required and output. The required fuel consumption approaches the output closest, i. e., the above difference is least, in the case of the kiln equipped with the Stehmann system. It is the author's opinion that a more rational comparison of kilns is achieved when fuel consumption, as well as output, is considered, than when output alone is made the criterion, although he fully realizes that it is impossible to add or subtract arbitrarily numerical values denoting such widely differing quantities as heat units and cubic meters. The illustration shows that the Stehmann kiln gives the most favorable results from the point of view of fuel consumption alone or of its relation to output.

Relation of Kiln Design to Output

The following statement is made in the concluding section of the report of the kiln committee. "No relation between kiln design (shape) and output could be established thus far." The output per cubic meter kiln capacity alone is not a criterion of the suitability of a kiln. In addition to this, the author believes, that since the output of a kiln depends on a number of factors other than the shape of the kiln, a general relation can hardly be expected to exist. It is sufficient to point in this connection to the wide variation in output results obtained under test conditions.

The kiln investigated by the kiln committee was the first wet process rotary kiln operating according to the Stehmann process. The most favorable conditions for such an installation had not as yet been established. The members of the kiln committee observed that part of the clinker was leaving the cooler shaft in a red hot condition. The utilization of the clinker heat was, therefore, incomplete. The kiln was still in an experimental stage and its investigation was somewhat previous. (Nevertheless, a saving of fuel of 14.8 per cent was established.)

Upon completion of the test, it was found that the air quantities recorded automatically during ordinary working conditions were 1000 cu.m. per hr. lower than the check values of the test. The kiln had thus operated with a deficiency of air. This was confirmed by the analysis of the waste gases made during the test, when 3 per cent CO was found in the latter. The coal was not burned completely, the kiln cooled by frequent interruptions. Due to this, the kiln ran at a low R.R.M. speed during feeding of the slurry, a condition, which resulted in a drop of output. Had the air quantities been recorded correctly, this could have been avoided. The output would have been higher, the fuel consumption remaining the same and the per cent fuel saved would have been raised.

The author would welcome tests, such as contemplated in the concluding section of the report of the kiln committee, in which intentional variations would be introduced in the fuel used, the composition of the raw materials, the temperature of the air, etc. For it is not the figures of the heat unit consumption nor of the output alone which determine the adequacy of a cement kiln, but its peculiar properties in their relation to the different conditions of operation which may present themselves.

In carrying out such tests, one should, therefore, try to establish on the basis of the values obtained and observations made any possible losses, as, for example, due to high waste gas temperature, hot clinker at the discharge end, inadequate fuel, incomplete combustion, which would all serve to point out the extent to which the kiln in question is adapted to the given conditions, and which special conditions might make it particularly desirable. Of interest would be the heat balance of the kiln, showing not only the effectively used up heat units, but also the productively used heat and such possible avoidable losses as may be established.

What the Stehmann Process Is

To make the above more comprehensive, the author wishes to point out some details of the calcination process of which he is the originator.

The Stehmann calcination process makes it possible to utilize effectively almost the entire clinker heat of a rotary kiln, thus effecting a considerable saving of fuel. This, however, is only its minor advantage. Far more important is the preheating of the air supply to a high temperature, which results in filling with rarefied air the vacuum temporarily produced in the lower part of the kiln due to the burning process, so that burning proceeds with low air quantities and complete combustion of the pulverized coal is effected soon after its admission into the kiln. This makes possible the use of grades of coal low in gas and with high ash content, which were formerly entirely inadequate for such purposes.

Other types of kilns operate with cold or insufficiently preheated air, the vacuum of the rotary kiln being thus filled with heavier air and greater quantities of air are used than required by the fuel.

The use of highly preheated air means further advantages. This method introduces the measurement of air quantities used in the kiln, the observation of the temperature of the air entering the kiln and of the fuel gases and the analysis of the latter. A record of these makes possible the discovery of faulty operation and a correction of the prevailing conditions.

The quality of the clinker also benefits by the process, for the temperature of the shortened sintering zone is also raised. Calcination proceeds at high temperature and, with properly registering devices, in an atmosphere of a mixture of gases with low CO content. The shorter dimensions of the sintering zone result in that the mass traverses the high temperature zone in a shorter interval. The danger of overburned clinker is thus reduced. Sudden cooling of the clinker, first in highly preheated and later in cooler air, produces an oxidation of such clinkers as may have been burned with a reducing flame in the sintering zone.

It is quite possible to equip such a rotary kiln with an installation for the utilization of the flue gases in steam generation. The quantity of heat to be recovered from the flue gases is naturally lower, due to their lower temperature and smaller quantities. The waste heat boiler installation will, therefore, assume a smaller scale.

However, when it is desired to produce as much power as possible from the waste gases of a rotary kiln, a Stehmann kiln using the quantities of fuel required by an ordinary rotary kiln would yield flue gases with considerably higher heat quantities available for steam generation, due to its better utilization of the clinker heat. These remarks are not the result of purely theoretical reasoning. They are substantiated by extensive practical experiments. (See in this connection an article by E. Knuttel in No. 11, "Zement," 1927.) All the kilns in the plant under his management have been remodeled to introduce the Stehmann process. No drop in production has been recorded, but a considerable saving of fuel was the result. "Novo-Zement," whose excellent qualities are sufficiently known, is now manufactured in these kilns.

The above data on the method of operation of rotary kilns were submitted to demonstrate that the suitability of a kiln may be estimated, if, in carrying on such tests, not only rows of figures relating to output are recorded, but when observations are made of the temperature of the air admitted for combustion, that of the flue gases, together with analyses of the latter, etc. The cement manufacturer will benefit by such records in deciding which type of kiln is best suited for the conditions at hand or in which way the existing installation may be changed to effect an improvement. In this manner he will be able to establish also which is the most economical kiln for the special conditions prevailing in his plant.

The Cement Industry, Plants, and Association Work of Australia

The statement of the chairman of Australia Cement, Limited (D. H. Dureau) at the recent annual meeting of that company, called attention to the difficult position which confronts Australian manufacturers who, because of the high production costs ruling in the commonwealth, cannot look for an export market for their surplus manufactures. So far as the cement industry is concerned the outlook is anything but satisfactory. Overproduction causes no little anxiety to the directors of the various enterprises.

At the annual meeting of the Sulphise Corporation, Limited, which has a large cement works at Cockle Creek, New South Wales, the chairman (the Earl of Kintore) warned shareholders that increased competition must result in decreased profits in the Australian cement industry. In these circumstances the indiscriminate establishment of new plants in a market which is now amply supplied, and the consumption capacity of which is definitely limited, must not only accentuate an already difficult situation, but actually constitutes a menace to the welfare of the industy as a whole. It can be stated that even under the most favorable conditions no justification exists for the erection of further cement manufacturing plants at this juncture, certainly, there are many avenues for the investment of capital which must for some time to come be regarded as infinitely more attractive than the launching of new cement manufacturing enterprises.

During the war local works were taxed to the utmost to supply the Australian requirements. This resulted in extensive plant additions to several of the existing enterprises and the establishment of a number of new works. The demand has, however, not increased to the extent expected, with the result that a plant of approximately 250,000 tons per annum is idle in Australia today. Taking the average capital at £5 ($25) per annual ton of cement produced, this means a capital outlay of £1,250,000 ($6,250,000), on which interest must be paid, and the price of cement regulated accordingly, for indubitably the existence of costly unemployed plants is reflected in the cost of production. The present position may be appreciated when it is stated that works in the commonwealth are capable of turning out 1,000,000 tons annually, against a consumption of 750,000 tons. So far as Victoria is concerned, Australian Cement, Limited, appears to be in a very favorable position. The works at Geelong, with a capacity of 200,000 tons per annum, were the pioneer cement works in Australia. They have been kept fully up to date by a progressive management.

African Cement Firm Increases Capital

The Societe des Chaux et Ciments du Senegal, with offices and plant in Dakar, Senegal, has increased its capital from 5,000,000 francs to 20,000,000 francs.

Cement Age

Celebrates Its Twenty-Fifth Anniversary

R. W. Lesley Was Founder and First Editor

ON June 1, 1904—just twenty-five years ago —the first issue of ***Cement Age*** was mailed to a group of men interested in the uses of concrete. This first issue contained a "Foreword" in which the following statement appeared:

"Only now we are realizing that we are entering upon a new era and one that in a few years will be recognized as the Cement Age even as its predecessor is accepted as the Electrical Age. The discoveries of new uses for cement are crowding each other's heels in such rapid succession that it is hard to weigh their value. Many brilliant minds are solving problems and adding to our knowledge of the art, and much, if not most, of the resulting literature is going to waste because there has been no systematic effort made to preserve it. It is with the idea of supplying this deficiency that ***Cement Age*** makes its humble bid for the recognition of the Engineering Public."

Portrait by Photocrafters.

With these introductory remarks, ***Cement Age*** was launched. Until 1912 it was published as a separate magazine, but in that year it was consolidated with ***Concrete,*** which publication celebrated its twenty-fifth anniversary with the March, 1929, Forecast Number.

Cement Age was established by Robert W. Lesley, who was its editor and owner until its consolidation with ***Concrete.*** After that Mr. Lesley continued his connection with the publication as consulting editor.

No more fitting manner of celebrating the twenty-fifth anniversary of ***Cement Age*** is possible than to pay some slight tribute to its founder and first editor.

As a pioneer in the field of concrete, Mr. Lesley was one of the charter members of the American Society for Testing Materials, of which he was vice-president for many years and is today an Honorary Member.

He was the first president of the Portland Cement Association, and is at present one of its Honorary Members.

In the early days of the American Concrete Institute, Mr. Lesley had an important part in its organization under its first charter. For many years he served the Institute as its treasurer.

In the formation of the many important joint committees of various engineering societies dealing with cement and concrete and the formulation of standard specifications, Mr. Lesley played a prominent part.

Mr. Lesley entered the cement industry in 1874 when he organized the firm of Lesley & Trinkle to deal in cement. In 1880 he became associated with David O. Saylor in establishing some of the earliest cement plants in America. He is now chairman of the executive committee, Giant Portland Cement Co., and is still active in the duties of the committees in which he holds membership.

It is this spirit of helpfulness to the industry it serves that was responsible for the upbuilding and growth of ***Cement Age.*** And it is this same ideal that has guided the policies of all the later issues of ***Cement Age*** and its successor, ***Concrete.*** Building on that background, the present publication is striving to uphold the high ideals that have been its incentive for the past quarter century. They express the underlying motive that will guide the conduct of the magazine in its future issues.

Contracts for Port Stockton Plant to Be Awarded

Bids for construction of the plant of the Port Stockton Cement Company at Stockton, Calif., were called for early in May and construction will begin as soon as contracts are awarded, according to an announcement by R. L. Dunn, one of the promoters of the company. Although the exact site has not been made known, it is believed that the plant will be established on the San Joaquin river, near the mouth of the channel. It will represent an outlay of $2,500,000 and have a capacity of 6,000 barrels per day.

The quarry, to cost $700,000, will be established on 800 acres already acquired by the corporation north of Columbia, Calif. Lime rock will be delivered to the mill on specially constructed barges, which will also be used to deliver the finished product. The Stanislaus river skirts the property, with mountain slopes a thousand feet high on either side.

The clay deposit is said to give a depth of twenty-seven feet of perfect clay. The material will be liquefied and transported by pump. Arrangements are under way for an extension of the Sierra railway.

Two additional plant units will be started upon completion of the first, increasing the total daily capacity to 9000 barrels.

The Port Stockton Cement Co. was organized by W. C. Stevenson, formerly chief engineer for the Pacific Portland Cement Company, Yosemite Portland Cement Company and the Pacific Coast Cement Company; A. E. Roberts, who had been with the Old Mission Cement Company; F. B. Hyder, formerly connected with the Daniel C. Jacklin Company, and Lanis Everett, geologist. Robert Lee Dunn, also one of the organizers, was formerly connected with the financing of the Carquinez, Antioch and San Mateo bridges.

The articles of incorporation, filed recently, state that the total authorized capital stock is 1,350,000 shares, all without nominal or par value. Three hundred thousand shares are preferred stock, non-voting; 1,000,000 shares are common class A common stock, having one vote per share, and 50,000 shares are class B common stock, having twenty votes per share.

The original subscribers of stock and directors are L. S. Ellis, A. L. E. Sampson, J. W. Legate, Z. M. Riley, L. L. Evans, J. H. Stern and George E. Barber.

International Plans Warehouse at Capitol City

The International Cement Corporation has announced plans for a large reinforced concrete cement warehouse, with complete cement packing plant, now in course of construction at Washington, D. C., 34th Street, K Street and the Potomac River.

A temporary warehouse at this location is now in service and will be used until the new plant is completed. The Washington plant, which will be operated by the Lone Star Cement Company, Virginia, Inc., International subsidiary, will have a capacity of 60,000 barrels of cement, and will consist of eight concrete silos, each 80 ft. in height, together with elevating and conveying equipment.

Cement is now being shipped to the Washington warehouse by barge from the plant of the Lone Star Cement Company Virginia, Inc., at South Norfolk. Special marine equipment is being used for this purpose.

In addition to Lone Star Cement, the new warehouse will also supply the "Incor" brand, high early strength portland cement.

"Diamond" Cement Production Touches 5260 Barrels Daily

Up to May 10th more than 80,000 barrels of cement has been manufactured and shipped by the Pacific Coast Cement Company, according to announcement of officials. The greatest production of "Diamond" portland cement for any one day since the plant started operations was 5,260 barrels of cement, or 25 carloads.

The steamship "Diamond Cement" has made eight trips so far this spring to Dall Island, Alaska, for limerock at the company's quarries. The rock is broken and poured into the holds of the new vessel in bulk. It is discharged at the company's dock on the waterway adjacent to the new cement plant.

Cutting her estimated turn-around time almost in half, the "Diamond Cement" made a recent voyage, during April, to Dall Island and return in five days and twenty-three hours, according to A. F. Marion, operating manager. When the service first started, ten days was set as fair time for the ship to complete the 1300-mile round trip, including loading and discharging.

Vote to Increase Atlas Common Stock 50 Per Cent

Stockholders in the Atlas Portland Cement Company, New York City, on May 1st voted to approve a plan to increase authorized no-par common stock to 1,500,000 shares from the present 1,000,000 shares. It was also voted to reduce the authorized preferred stock to $26,300 from the present $2,500,000. This will be effected by the cancellation of 74,211 shares of $33.33 1/3 par value, including shares which have been surrendered for exchange for common or cash and also such preferred shares as may have been purchased by the company and held as treasury stock and exchanged by the company for common.

Directors were re-elected.

Legislative Committee Takes Up Michigan State Plant Problem

Representatives of privately owned cement plants in Michigan appeared before the House Committee on State Affairs of the state legislature on April 23rd, to urge abandonment of the state plant at Chelsea.

The occasion was a hearing on a resolution calling on the State Administration Board not to sell the plant but to junk it. A bill introduced would permit the Administration Board to sell the plant at not less than the initial cost, $792,000.

Both the bill and the resolution followed a report to the legislature by Gov. Fred W. Green, in which he said the plant was being operated at a loss and advised authorization by the legislature for its sale. How the proposals fared has not yet become known.

Monolith Officials to Visit Wyoming Plant at Opening

Officers, members, shareholders and friends of the Monolith Portland Cement and Midwest companies will visit the plant of the latter company at Laramie, Wyoming, leaving Los Angeles, California, on a special train chartered for the occasion, on June 22nd. The plant will be formally opened at that time.

Limestone for New Seattle Plant Brought from Alaska

Project Based on Exhaustive Surveys of Economic Conditions—Design of New Plant Based on Studies of Cement Technology, Modern Machinery and Methods—Raw Material Handling Influences Plant Layout—Rock Delivered from Alaska in Steel Cargo Ships—Hammerhead Crane Handles Rock at Plant Wharf—Clay Department—Plant Equipment—Cottrell Plant—Laboratory—The Alaska Quarry—The Development of the Project—Plant Designed to Make Normal and Special Cements

By S. E. HUTTON
Research Engineer, Pacific Coast Co., Seattle
Photographs by Boris Kviatkovski, Draftsman, Pacific Coast Engineering Co.

(Continued from the May issue)

Cement from the finishing mills is delivered by 16-in. Link-Belt screw conveyor to a 6-in. Fuller-Kinyon pump, driven by a 100-h.p. Fairbanks-Morse, 2300-volt motor. A 5-in. pipe line, over 500 ft. long, running along the north side of the clinker storage building, delivers the cement through Fuller-Kinyon valves and pipe line branches on the open flat roof over the silos.

Stockhouse

The stockhouse, designed and built by the Macdonald Engineering Company, consists of nine silos, 24 ft. in diameter and 85 ft. deep, inside, and the included four star-bins. The silos rest on a 20-in. slab over a 10-ft. basement, under which is a 45-in. slab on 937 piles, 44 ft. long.

Three lines of 16-in. screw conveyors, in rectangular concrete troughs on the basement floor, receive cement through nine rectangular chutes from each circular bin and two from each star bin, and carry it into the basement of the bag house. Numerous connections for compressed air permit agitating cement in the bins near the chute openings.

Centrally Mixed Concrete Used

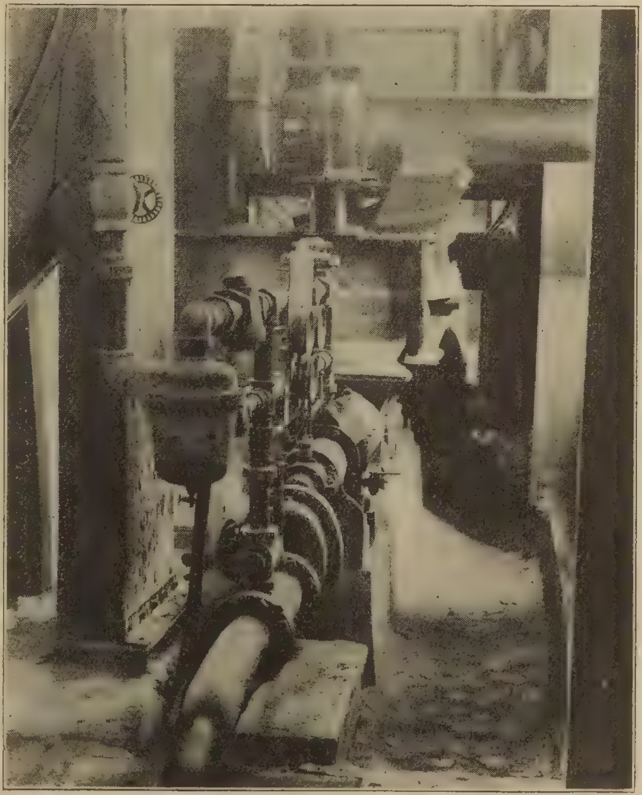
One of the unique features in the construction of this stockhouse was the use of ready-mixed concrete brought from the Harbor Island yard of the Pioneer Sand and Gravel Company, three-quarters of a mile away. During the period of eight days and nights, in which the silo walls were carried up with sliding forms, trucks arrived without interruption at intervals not greater than fifteen minutes.

Bag and Pack House

Immediately to the eastward of the stockhouse is the combined bag and pack house, a heavy reinforced concrete building about 78 ft. square, designed to include three stories and a basement, but built only two stories high.

Elevator Equipment

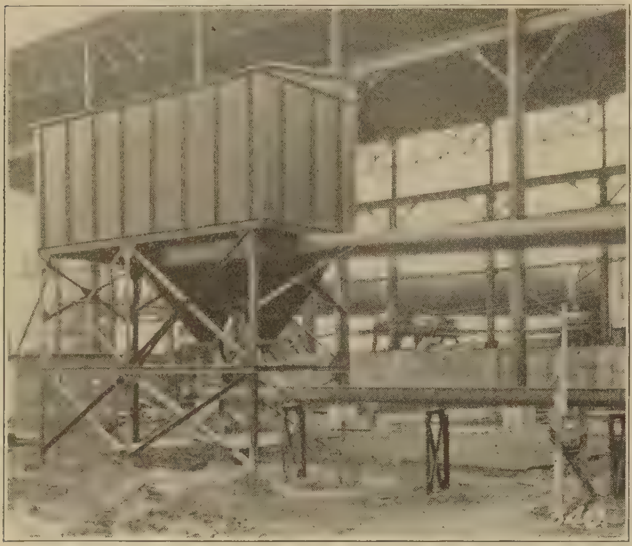
On the roof are penthouses for the Otis freight elevator hoist and motor, and for the cement elevator head and the conveyors over the packer bins, with their driving motor and its speed reducer. The building supports a structural steel frame carrying an easy stair leading to the roof of



The Fuller-Kinyon pump in its temporary location. The separator is seen in the foreground and the return conveyor from the dust arrester is seen above the stock house. A New Haven flat bag dust arrester on the roof serves the packing and bag departments.

Conveyor Provisions for Two Kinds of Cement

Along the west side of the basement are cross-conveyors which take cement from the stockhouse conveyors and deliver it into the boot of one of the two elevators for which provisions have been made. When the second elevator is installed, it will, if necessary, be possible to handle two kinds of cement, and to deliver the contents of any stock bin to any packer bin.



A New Haven flat bag dust arrester is installed adjacent to the mill building

The bag conveyor is mounted on wheels and can be withdrawn into the packhouse. Note the hoppers to catch dust from the main belt and to receive the content of broken bags

Packing Facilities

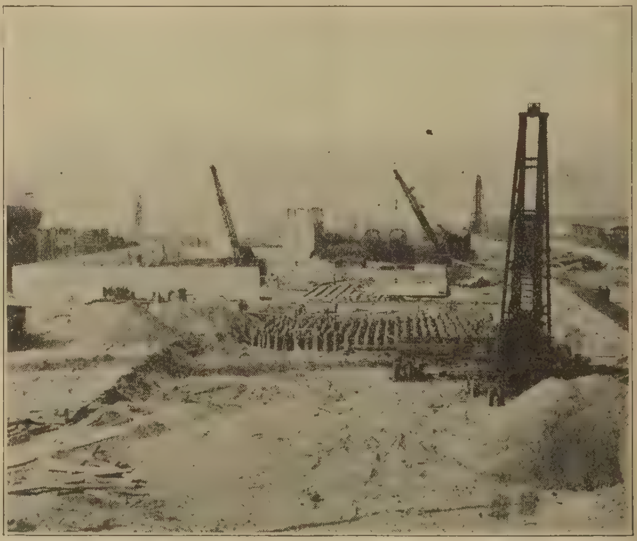
On the first floor, along the west wall, are two Bates three-tube packers in a conventional arrangement. The bag conveyor is somewhat out of the ordinary in being mounted on wheels so that carloading can be done by trucking across the baghouse platform into the car, or by delivering the bags inside the car door; also, in having hoppers and conveyors for recovering dust shaken from the bags, and for receiving the contents of broken bags.

The experimental Bates bag tying machine, and bag table. The steel plate top, secured by a gudgeon, rotates on inverted casters in the table legs

Facilities for the loading of bulk cement in box cars are installed, and the plant design includes a separate packing and loading plant for truck deliveries.

Foundations and Buildings

The plant is built on tide flats that have been filled with fine sand dredged from the Duwamish River. Wash-borings to a depth of a hundred feet show only sand and gravel, so heavy loads must be supported on piles.



A westward view from the office and laboratory building in September, 1928. A group of the 937 piles used in the stock-house construction appear in the foreground

Two standard lengths of pile, 36 ft. and 44 ft., were adopted, and numbers were proportioned to the loads to be borne on pile groups. Piles were driven almost exclusively by steam hammer, and were jetted to depths only 8 to 10 ft. less than their total penetration. On more than 30 per cent of all foundation piles driven, observations were made, and load carrying capacities were calculated and plotted.

A number of the lighter loads were placed on floating foundations, and in such cases provisions were made for adjustments to take care of the inevitable settlement that would occur when loads were put on. The specific device resorted to in the case of the slurry tanks was pointed out in describing their design.

Building design was subordinated to construction and operating considerations, with the result that a considerable variety of details is to be found. The laboratory and office building, above the concrete basement and first floor, is of timber mill construction with laminated second floor and roof, and stuccoed exterior. This design was least costly, and permitted early occupancy. The baghouse and silos are of the most modern reinforced concrete construction. The clinker storage and mill buildings have concrete foundations and walls, steel columns and trusses, and wood roofs.

The coal mill building and the firing building consist of heavily reinforced concrete main floor and columns, on piles, surmounted by light steel frames carrying Transite siding and laminated wood roofs. Johns-Manville ten to twenty year roofings were used. Truscon steel sash are used throughout the plant.

Foundation piles were driven by the Puget Sound Bridge and Dredging Company. The principal concrete foundations were put in by Peder Gjarde. Structural steel was put up by Wallace Bridge and Structural Steel Company. The wharf was built and the dredging was done by McEachern Construction Company.

Power

Originally, a waste-heat power plant, with some unique applications of steam power, was considered, but the lighting department of the city of Seattle quoted such favorable rates that a twenty-year power contract was entered into. It provided for billing on a kilowatt hour basis during an eighteen months' period of construction and adjustment, and, thereafter, on the basis of monthly maximum thirty-minute demand.

Power is delivered to the city's transformer bank on the property over two 26,000-volt lines, and to meters on the switchboard at 2300 volts. The contract provides for meters owned by both parties, bills to be based upon the readings of both sets of meters, and to be agreed upon by the contracting parties, before being rendered. The city uses a graphic curve-drawing meter, and the cement company a watt hour and a recording maximum demand meter.

Balance room. Balances rest on a concrete slab carried on rubber blocks

Through a totalizing panel in the main switchboard, built in the Seattle shops of the Westinghouse Electric and Manufacturing Company, and installed on the mezzanine floor in the mill building, power is distributed through the main motor panels to the right and line panels to the left. Dead-front distributing cabinets are used throughout the plant on 440-volt circuits.

The laboratory is a development from the coal laboratory of the Pacific Coast Coal Company, in which, from

Showing the landing of machinery and supplies from the S. S. Mazama at View Cove, Alaska, early in 1928 time to time, various research jobs were done for the Pacific Coast Company. In 1926, N. H. Nelson, chemical engineer, was engaged to take charge of the laboratory investigation of raw materials. Later, very complete experiments were carried out in making portland and special cements from the various materials available. In these experiments, cements developing a 28-day strength in 3 days, and also, some developing 28-day strength in 1 day, were made. It is commercially practicable to manufacture such cements in the new plant.

The new laboratory includes, in the basement, storage space for car samples and a thermostatically controlled constant temperature moist room for briquettes, and, on the first floor, a sampling room with drying, crushing, grinding, and mixing equipment, a physical testing room with the usual equipment for sieve, pat, and briquette tests, a chemical laboratory with equipment for coal analyses, routine cement plant analyses, and chemical research work, a balance room, and an office.

The Quarry

The quarry lies on a peninsula of Dall Island, between Tlevak Strait and Baldy Bay, about 40 miles west of Ketchikan, Alaska. It is about 700 statute miles from Seattle, and is reached by either the inside or the outside passage to Dixon Entrance, and then through Cordova Bay.

In February, 1928, the S. S. "Mazama," chartered by the Pacific Coast Engineering Company, general contractors, was loaded at Seattle with construction, power plant, and quarry machinery, construction materials, and subsistence requisites; and with 65 men aboard sailed for View Cove with two scows in tow. For a period of ten weeks, the ship lay at anchor, off the wharf site, serving as warehouse and for living quarters while sufficient progress was made in the early stages of preparation for building the powerhouse and the wharf to permit the landing of the ship's cargo on a steep, rocky, timber-covered shore with no beach, and with a daily tide range of 12 to 16 ft. Radio communication with the Alaska cable office at Ketchikan has been maintained since the arrival of the "Mazama" in View Cove.

Rock is drilled with Ingersoll-Rand air drills and Sanderson-Cyclone well drill, blasted down with dynamite and loaded by a Bucyrus 50B electric shovel with Ward-Leonard control into 8-yd. pan-type steel quarry cars built by the Pacific Car & Foundry Company of Seattle. Two Plymouth standard gauge gasoline locomotives haul the rock to the crushing plant which contains a Traylor 4 ft. by 12 ft. steel pan feeder, a Traylor 42 in. by 48 in. steel-frame Bulldog crusher driven by a 125-h.p. G. E. motor, a Dixie Mogul hammermill driven by a 150-h.p. G. E. Motor, and an 18-in. belt conveyor for delivering the rock into the storage pit, excavated in the solid rock above the wharf.

Through draw gates in the roof of a tunnel under the rock storage pit, the rock falls upon a 36-in. belt conveyor which carries it to a tower on the wharf, from which it is spouted into the ship's holds. No trimming is required.

No fresh water being available in the dry summer season, the power plant consists of Fairbanks-Morse 6-cylinder Diesel engines direct-connected to 240 k.v.a., 2300-volt, 3-phase generators. In the power plant are housed Ingersoll-Rand air compressors, and motor driven fire and circulating pumps.

The Development of the Project

This project is an excellent example of the development of the results of an economic investigation, such as is ordinarily regarded as being of only academic interest or significance, into a highly technical commercial operation.

Cement making was listed among numerous industries, the development of which, in the Pacific Northwest, would be or might be of direct or indirect interest to the Pacific Coast Company. It was determined, first, that in the matter of getting raw materials to the mill, and the product to the market, no other location was so advantageous as one on tidewater in Seattle. This required an investigation of sources of raw materials, and of locations of and means of reaching significant parts of the Pacific Coast market. Limestone presented the greatest problem. Wherever it was to be found in western Washington, the conclusion as to plant location remained the same.

Because the limestone situation has been precarious to many plants on the Pacific slope, limestone supplies from British Columbia and from Alaska, as well as from western Washington deposits, were investigated. When quantity, quality, and cost of developing, quarrying and transporting limestone were considered, it was found that no Washington deposit, even if obtainable without cost, could compete with a deposit acquired on Dall Island in southeast Alaska.

Field work included sampling, surveying, tunneling, and diamond-drilling all deposits of the slightest promise. and, also, such additional work as was necessary to calculate costs of opening, developing, and operating a quarry.

The Dall Island deposit having been selected as the best, if not the only one worth developing, further surveys, weather observations, and soundings for a wharf were made there in the winter of 1926-27; and in the early spring of 1927, a topographic survey was made, and diamond drilling was done. During the summer, Baldy Bay was surveyed by the U. S. Coast and Geodetic Survey and wire-dragged up to the wharf site in View Cove.

At the same time that limestone deposits were under investigation, studies were made of cement technology, of cement making equipment, and of the economics of cement plant design.

Technical investigations were made by the research staff of the Pacific Coast Company, assisted by the specialists employed by its various subsidiaries. Findings were reviewed by various consultants engaged for the purpose. Reports, on which the financing of the project was based, were made by Arthur E. Wells, consulting engineer of New York, and by the Cowham Engineering Company of Chicago.

The plant was designed by S. E. Hutton, research engineer of the Pacific Coast Company, and was constructed by the Pacific Coast Engineering Company, as general contractor, with S. E. Hutton in charge as chief engineer of the project, and with W. C. Stevenson as engineer in charge of field work.

Personnel

Officers of the Pacific Coast Company, connected with the administration of the affairs of the Pacific Coast Cement Company are Walter Barnum, president; E. C. Ward, vice-president and general manager; N. D. Moore, vice-president in charge of operations, Wylie Hemphill, vice-president in charge of sales, H. M. Watkins, general auditor, S. E. Hutton, research engineer, and Carl English, purchasing agent.

W. H. Green is plant manager for the Pacific Coast Cement Company, Darwin Meisnest is assistant sales manager, N. H. Nelson is chemical engineer, E. H. Sirman is chief electrician and master mechanic, and John Bratschi is general foreman at the plant. D. C. McDonald is superintendent at the quarry.

Spread of Cartel Movement Seen in Europe

Rapid spreading of the cartel movement throughout Europe, even into the smaller industrial countries of the continent, is disclosed in the various reports on current economic developments in foreign countries made to the National Industrial Conference Board, 247 Park Avenue, New York, by its foreign correspondents, whose special reports constitute part two of the board's second semi-annual volume on world economic conditions, just published. Cognizance is also taken of the American economic penetration of Europe, indicating a significant reversal of the flow of capital and industrial enterprise between the two continents, and governmental policies in the various countries relating to industry and trade and the international economic implications of such policies are discussed in detail. A summary picture of economic progress in each country is contained in the first part of the volume, giving authentic data on production, wages, employment, prices, foreign trade, public and private finance.

The significance of these foreign reports made to the Conference Board is described as follows by Magnus W. Alexander, president of the board:

"Constantly changing economic conditions both abroad and in the United States since the war and the increasingly closer economic relations between the United States and other countries have made more comprehensive and better information on foreign business trends a paramount need. Realizing this need, the National Industrial Conference Board has undertaken to supply such information at intervals, not only from available official statistics, but chiefly through authentic analytical reports from outstanding men in the industrial, commercial and financial life of the various foreign countries, including eminent economists and statesmen.

"The Conference Board, in the pursuance of its aim to make available to American industry comprehensive, authentic and timely information on economic trends affecting business life, is collecting these reports from at present twenty-nine foreign correspondents who, in spite of the responsible positions held by them in their own countries, voluntarily prepare these analytical statements to the Conference Board with remarkable regularity, in order to further the exchange of information on economic conditions between their countries and the United States for the benefit of industry and commerce throughout the world, and for the far-seeing purpose thereby to aid in furthering better international understanding and relations."

Survey Shows Rising Cement Capacity and Production

Capacity and production of American portland cement companies have risen steadily since 1921, according to a comprehensive survey published by Frank H. Crehore & Co. in their 1929 edition of "Cement," the New York City press states.

In 1928, capacity was 237,794,000 barrels and production was 175,968,000, compared with 144,354,000 and 98,842,000 in 1921. From 1914 to 1921 capacity and production showed a smaller increase, capacity in 1914 being 115,000,000 barrels and production 88,230,000.

Imports of cement into this country have risen approximately nineteen times since 1915, the survey discloses, although the total amount from foreign countries in 1928 was only 2,283,351 barrels, slightly more than 1 per cent of total production.

Yosemite Celebrates Operation of Full Year Without Accident

Celebrating a full year of operation without an accident, seventy-five officials and employes of the Yosemite Portland Cement Company, Merced, Calif., dined at a local hotel on April 24th.

G. A. Fisher, general manager of the company was toastmaster and the principal speaker was J. M. Buswell of Fresno, chief safety engineer. Other speakers were E. L. Harvey, power company representative, A. P. De Jonckheere, plant superintendent of the Yosemite company, and Wm. Jastram, quarry superintendent. Ralph Tomassini and R. D. Redere, company employes, took part in the musical program.

Universal Makes First Shipment of Finished Product from Buffington Harbor

Buffington harbor of the Universal Portland Cement Company, at Gary, Indiana, took its place as a full lake port on April 26th, when the first cargo of cement was shipped from the plant at Buffington. The harbor has been used for receiving raw materials for the past two years.

Regular shipments from the Buffington plant to other lake ports are to follow. The initial cargo was shipped to Milwaukee, Wis.

Pacific Coast Cement Plant Heads "In Contempt" Freed on Technicality

The nine executives of various California cement companies on May 14th won their fight to prevent the state Senate from imprisoning them for "contempt of the Senate."

Those involved were Wm. H. George, George R. Gay, E. E. Duque, John Treanor, C. C. Merrill, Carroll A. Low, Arthur Shelby, A. Emory Wishon, and Harry T. Battelle.

The state supreme court granted the application of the cement men for a writ of habeas corpus and discharged them from custody. The court held that although the Senate had power to hold them in contempt and commit them to jail for their refusal to answer certain questions in a "cement trust" investigation, the Senate failed to exercise its right in the exact manner required by law.

Accident-Free Month Sought in June Campaign

The first day of June will again have seen the unfurling of safety flags and the inauguration of an accident prevention campaign in the more than one hundred and sixty United States and Canadian cement plants working with the Portland Cement Association.

A perfect, no-accident, record is the aim of the association, the national and state departments of labor and the national and local safety oragnizations co-operating with the former.

The June campaign was preceded by a nationwide program of accident prevention and first aid training sponsored co-operatively by the U. S. Bureau of Mines and the cement association. Application to receive the training was made by more than one-third of all plants.

MEN and MILLS

Notes from the Field

General Trexler, Former Lehigh Head, Seventy-Five Years Old

Foremost Citizen of Allentown, Penn., Continues Activities in Business and Private Life—Was First President of Lehigh

Allentown, Pennsylvania, took much pride recently in marking the seventy-fifth birthday anniversary of General Harry C. Trexler, hailed as its foremost citizen. He has been a resident in the vicinity of Allentown since 1856. General Trexler is chairman of the board of directors of the Lehigh Portland Cement Co.

Although he was attacked by a siege of serious illness several years ago, he has fully recovered and enjoys good health.

One of General Trexler's activities has been the promotion of the Boy Scout movement in Lehigh County, and coincidentally he was the recipient on April 16th of a statuette designed to honor men who have made notable contributions to the work.

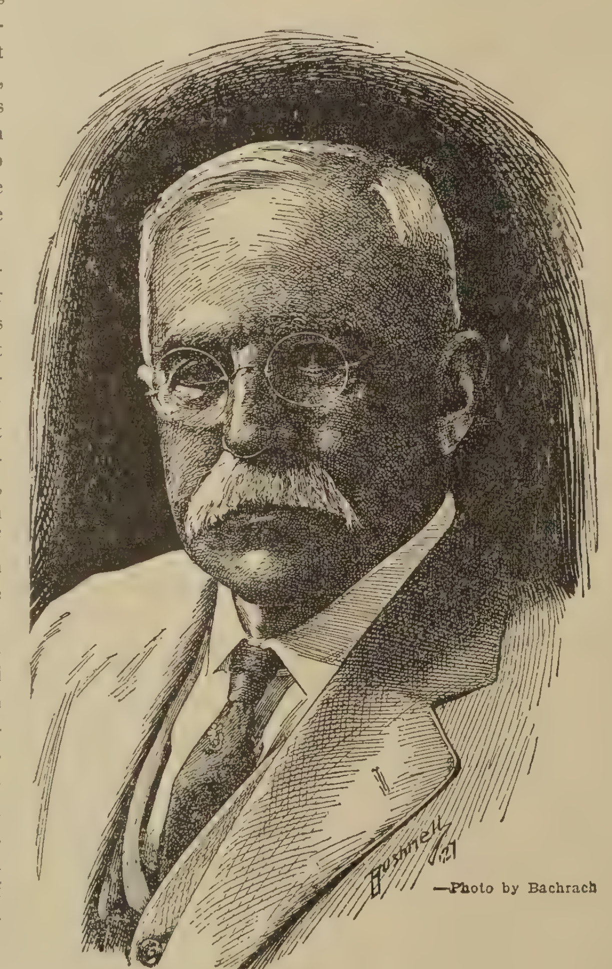
The outstanding contribution of the general, for which the statuette was awarded, include consistent support of the Scout movement since its establishment in Lehigh County; the gift of 145 acres of land in Monroe County as a camp site, and activities in the Lehigh County Scout Council, of which he is and has been the honorary president since its inception.

General Trexler was born at Easton, Pennsylvania, and received his education in the public schools of Lehigh County. He early engaged in the lumber business as an associate with his father, the late E. W. Trexler. He is still engaged in this line as president of the Trexler Lumber Company.

General Trexler was one of the organizers of the Lehigh Portland Cement Co. and was the first president of the company. He is now a director of the following: Lehigh Valley Railroad Company, Lehigh Power Securities Corporation, Lehigh Valley Transit Company, Pennsylvania Power and Light Company, Lehigh Telephone Company, and the Trojan Powder Company.

General Trexler has always taken a keen interest in agriculture in its various branches and has found time, notwithstanding his many other business activities, to devote himself to the development of his many farms, fish and big game preserves.

He was connected with the national guard of the state of Pennsylvania for over twenty-five years and was retired in 1918 with the rank of brigadier-general.



—Photo by Bachrach

General Harry C. Trexler

A. W. King Heads Cowham Service Department

A. W. King, who for the past two years has been associated with the Structural and Technical bureau of the Portland Cement Association, has resigned to become manager of the service department of the Cowham Engineering Company, with offices at 111 West Monroe Street, Chicago, Ill., effective since May 16, 1929.

A service department with Mr. King as its head has been established by the Cowham company. He is particularly fitted to head such a department both from the standpoint of education and training. Prior to his connection with the Portland Cement Association he was in charge of the Materials Testing Laboratory of the Bureau of Science, Manila, P. I., for 10 years, during which period he was appointed professor of civil engineering in the College of Engineering, University of the Philippines. Later he was connected with the Kalman Floor Company as sales engineer and for two years was engaged in technical, research and promotion work for the Atlas Lumnite Cement Company. Mr. King is well known as the author of a number of scientific and technical papers which have had widespread circulation.

The Cowham Engineering Company has been engaged in the portland cement industry for the past twenty-five years and is now associated with the following companies in their management and operation: Consolidated Cement Corporation with mills at Cement City, Michigan, Mildred and Fredonia, Kansas; Florida Portland Cement Company, with a mill at Tampa, Florida; Signal Mountain Portland Cement Company, with a mill at Chattanooga, Tennessee.

Rhode Tells Rotarians About Cement

Howard Rhode, advertising manager of the International Cement Corporation, declared recently before a luncheon meeting of the Rotary club at Saratoga Springs, New York, that "with the possible exception of the auto industry, the cement industry has shown the greatest recent growth of any business in the world."

Mr. Rhode also explained to the Rotarians the process of manufacturing cement, as well as the need for a high protective tariff on cement.

Cement Statistics for April

Shipments, Stocks and Production Show Increases—Totals for Year to Date Lower—Estimates Include Increased Capacity Due to Extensions and Improvements at Old Plants

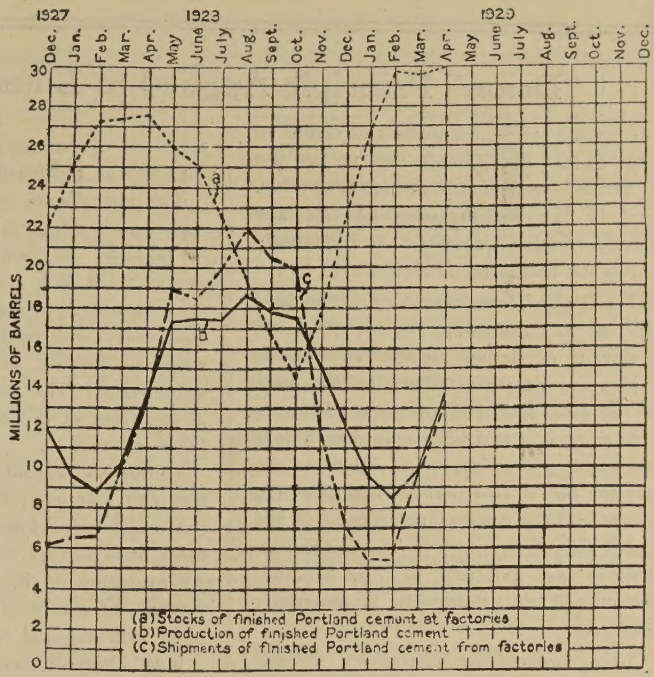
NOTE: IN ORDER THAT THE READER MAY KNOW THE TREND AT A GLANCE, THE HIGHER FIGURE, WHETHER FOR EITHER YEAR, UNDER ANY CLASSIFICATION APPEARS IN SLIGHTLY HEAVIER TYPE.

Relation of Production to Capacity

(Figures represent per cent)

	April 1929	April 1928	March 1929	Feb. 1929	Jan. 1929
The month	67.1	**70.0**	47.4	44.8	46.5
The 12 months ended	71.1	**74.0**	70.9	71.0	71.0

	1928	1929	Increase or Decrease, Per Cent
Production, April	10,223,000	**13,639,000**	1.3
Shipments, April	**13,307,000**	13,139,000	0.1
Stocks at end of April	27,627,000	**30,044,000**	8.7
Total production for year to date	**42,256,000**	42,011,000	—0.59
Total shipments for year to date	**36,546,000**	34,587,000	—5.7
No. of plants reporting	156	**159**	



Production, Shipments and Stocks of Finished Portland Cement, by Districts, in April, 1928 and 1929, and Stocks in March, 1929

District	Production—April 1928	Production—April 1929	Shipments—April 1928	Shipments—April 1929	Stocks at end of month 1928	Stocks at end of month 1929	Stocks at end of March, 1929*
Eastern Pa., N. J., and Md.	**3,084,000**	3,005,000	**3,303,000**	3,165,000	6,448,000	**6,781,000**	6,941,000
New York and Maine	831,000	**900,000**	**850,000**	732,000	1,847,000	**2,242,000**	2,073,000
Ohio, Western Pa., and W. Va.	1,321,000	**1,401,000**	1,154,000	**1,274,000**	3,577,000	**3,777,000**	3,650,000
Michigan	**1,056,000**	964,000	846,000	**897,000**	2,467,000	**2,658,000**	2,591,000
Wisconsin, Illinois, Indiana, and Ky.	1,438,000	**1,903,000**	**1,670,000**	1,608,000	3,429,000	**4,343,000**	4,049,000
Va., Tenn., Ala., Ga., Fla., and La.	**1,381,000**	1,117,000	**1,276,000**	1,251,000	2,040,000	**2,114,000**	2,248,000
Eastern Mo., Iowa, Minn., and S. Dak.	1,142,000	**1,150,000**	**1,154,000**	1,086,000	3,901,000	**4,362,000**	4,297,000
Western Mo., Nebr., Kansas, and Okla.	906,000	**932,000**	803,000	**1,034,000**	**1,566,000**	1,395,000	1,497,000
Texas	557,000	**622,000**	538,000	**625,000**	**468,000**	443,000	446,000
Colorado, Montana, and Utah	200,000	**217,000**	217,000	**259,000**	**465,000**	409,000	451,000
California	**1,254,000**	1,085,000	**1,184,000**	1,058,000	**929,000**	920,000	894,000
Oregon and Washington	298,000	**343,000**	312,000	**330,000**	450,000	**600,000**	587,000
	13,468,000	**13,639,000**	13,307,000	**13,319,000**	27,627,000	**30,044,000**	29,724,000

Production, Shipments and Stocks of Finished Portland Cement, by Months, in 1928 and 1929

Month	1928—Production	1929—Production	1928—Shipments	1929—Shipments	Stocks at end of month 1928	Stocks at end of month 1929
January	9,768,000	**9,881,000**	**6,541,000**	5,707,000	25,116,000	**26,797,000**
February	**8,797,000**	8,522,000	**6,563,000**	5,448,000	27,349,000	**29,870,000**
March	**10,223,000**	9,969,000	**10,135,000**	10,113,000	27,445,000	***29,724,000**
April	13,468,000	**13,639,000**	13,307,000	**13,319,000**	27,627,000	**30,044,000**
May	17,308,000	....	18,986,000	....	25,984,000	....
June	17,497,000	....	18,421,000	....	25,029,000	....
July	17,474,000	....	19,901,000	....	22,580,000	....
August	18,759,000	....	21,970,000	....	19,374,000	....
September	17,884,000	....	20,460,000	....	16,799,000	....
October	17,533,000	....	19,836,000	....	14,579,000	....
November	15,068,000	....	11,951,000	....	17,769,000	....
December	12,189,000	....	7,384,000	....	22,650,000	....
	175,968,000	....	175,455,000	....	....	....

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*Revised.

Mill Equipment

"Deion" Principle Applied to Linestarters

Increased safety, economy, and rating on Class 11-200 Linestarters due to the use of "Deion" contactors is the latest development of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., in the linestarter field.

This "Deion" contactor is one of the most effective arc rupturing devices employed in starters of similar ratings. It confines, divides and smothers the arc quickly without the usual flash and attendant scattering of flame, it is stated. Not only does it provide for a greater degree of safety to the operator but it also permits a smaller enclosure and the consequent decrease in the overall size of the starter. The arc is ruptured so fast, and with so little fire that contact and arc chute life is materially measured.

These contacts are guaranteed to rupture from twelve to sixteen times their normal current carrying capacity at rated voltage under the most severe operating conditions of low power factor and sustained voltage.

The "Deion" contactors are an application of a fundamentally new invention of Dr. Slepian, Westinghouse engineer. During operation the following sequence takes place.

1. The arc, resulting from opening the circuit is drawn in air.
2. Blown into the deionizing chamber by a magnetic field.
3. The original arc is broken up into many short arcs.
4. Each short arc is magnetically rotated to extinction.
5. Complete dionization occurs, as the line current passes through zero, and the circuit is broken.

"Non-Glare" Glass for New Instruments

The use of a special glass to prevent glare is one of the features of new instruments for switchboards introduced by the General Electric Company. The special glass, in combination with anti-parallax scale and pointer, facilitates reading regardless of the angle from which the instrument is viewed.

The new line of instruments is uniform in size and appearance for both alternating-current (Type AD) and direct-current (Type DD) ammeters, voltmeters, wattmeters, reactive volt-ampere meters, power-factor meters, and frequency meters. They are listed in standard commercial frequencies, but special ratings and scale markings can be furnished.

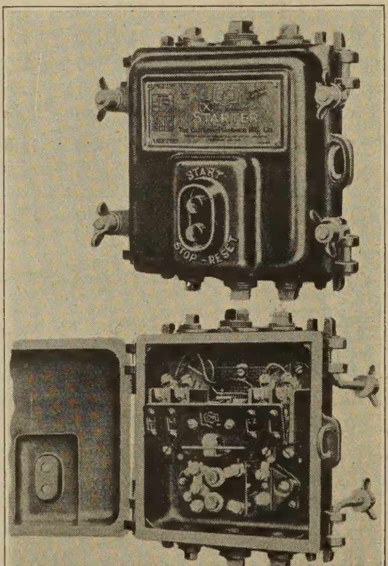
The instruments are 6 inches high, 5½ inches wide and 3½ inches deep, making it possible to mount four instruments across a 24-inch switchboard panel, and to economize on space. They are back-connected, and equipped with mounting studs to support the instrument on the switchboard. The removal of two screws at the front of the cover permits it to be taken off readily.

Voltmeters, wattmeters, power-factor meters and reactive volt-ampere meters have the resistors enclosed in the instrument cases, thus further conserving panel space. An exception to this is the wattmeter for voltages in excess of 140, which are supplied with external resistors.

Both alternating-current and direct-current instruments have electromagnetic damping.

Dust-Tight Enclosures for Cutler-Hammer Starters

The development of dust-tight enclosing cases for their across-the-line automatic starters, is announced by Cutler-Hammer, Inc., Milwaukee, Wis.



These new enclosures are built in two types: For motors up to 5 hp., the case is of cast-iron and for larger sizes it is made of heavy welded boiler plate. They are provided with a soft Para rubber gasket between the cover and case. Eyebolts with wing nuts at the sides, hold the cover tight. In addition to being dust-tight, the small cast-iron enclosure is also weatherproof. It has the start, stop and reset buttons mounted directly in the cover. The larger sizes have the reset button only in the cover and a separate dust-tight push-button station provides remote control.

The new dust-tight equipment will not replace Cutler-Hammer's standard dust-proof enclosures, but is to be offered as an optional installation.

New Mine Switching Equipment Occupies Small Space

A new design of automatic switching equipment for synchronous motor-generator sets in mining service is announced by the General Electric Company and was exhibited at the Exposition of the American Mining Congress in Cincinnati, May 13 to 17. This equipment, occupying about half the floor space of previous designs, not only retains all the advantages of older forms but also includes many more, it is stated.

The new design is for use with motor-generator sets rated 50 to 300 kilowatts, 2300 volts alternating current and 275 volts direct current, the standard mine voltage. Like older forms, it automatically controls the starting and stopping sequence for the machine and, at the same time, affords full protection for the machine and equipment while starting and during operation. A stub-multiple reclosing feeder connects the generator to its load and likewise protects the machine against abnormal direct current overloads.

The principal new features are the use of a new starting and running contactor and the compact arrangement of the high-tension switching equipment. The new contactor, in itself very compact, is mounted in an angle iron framework together with the oil circuit breaker, current transformers and potential transformer. The starting auto-transformer is mounted on the top of this frame. All the high-tension wiring among these various parts is done by the manufacturer. Also, all the control leads which connect to the switchboard have been brought to a terminal block conveniently located near the bottom of the framework. Despite the very compact arrangement of switching equipment in this framework, all the component parts are readily accessible for inspection and maintenance, according to the manufacturer.

With the Manufacturers

NOTES FROM THE FIELD

Cutler-Hammer Opens Warehouse at Cleveland

To provide facilities better to serve their trade in the east central states, *Cutler-Hammer, Inc.,* Milwaukee, Wis., announce the establishment of a warehouse at Cleveland, Ohio. The company has leased 1600 square feet of floor space for the storage of stock for quick deliveries. A complete line of standard motor control equipment and wiring devices will be available for immediate shipment.

The territory to be served by these new facilities includes Cutler-Hammer's entire central sales district consisting of the states of Ohio and West Virginia, the province of Ontario, western New York and Pennsylvania and sections of Maryland, Indiana, Tennessee and Kentucky. Sales offices for the district are located in Cleveland, Cincinnati, Buffalo and Pittsburgh.

Lothrop Is Timken Head

At a meeting of the board of directors of the *Timken Roller Bearing Company,* on May 7th, Marcus T. Lothrop was elected president of the company, succeeding H. H. Timken, who becomes chairman of the board. Other officers elected were W. R. Timken, J. G. Obermier, J. W. Spray, T. V. Buckwalter, and H. J. Porter, vice presidents, and J. F. Strough, secretary-treasurer. Another of the company's old-timers who has been advanced is Judd W. Spray, vice-president and general sales manager, who was made one of the directors at the recent annual stockholders' meeting. All of the previous members of the board of directors were re-elected, including; H. H. Timken, W. R. Timken, J. G. Obermier, M. T. Lothrop, and J. F. Strough. Another newly elected director is A. C. Ernst, of Cleveland, Ohio.

Mr. Lothrop started with the Timken Company in 1911, as metallurgist, and for the past eighteen years has been intimately connected with its affairs, being closely associated with H. H. Timken. During that time he has occupied various capacities successively, in metallurgy, research, in charge of operations, and for the last few years as vice-president and general manager in charge of all operating and sales.

Mr. Spray has been with the company for fourteen years in various capacities, having been Detroit sales manager up to 1926, after which he was general sales manager until 1928. At that time he was made vice-president in charge of sales.

Quigley Moves New York Office

The Quigley Furnace Specialties Company, New York, manufacturers of high temperature cements, protective coatings, and other similar products, has moved its main office to the Lakner Building, 56 West 45th Street. The new headquarters and research laboratory occupy the entire eighth floor. This location is in what is known as the heart of New York City. The offices were formerly located at 26 Cortlandt Street.

According to W. S. Quigley, president, the removal was made necessary by increased business. Factory facilities have been in the process of being enlarged and modernized for some time and this is now practically completed.

Pangborn Takes Over Universal

The Pangborn Corporation, of Hagerstown, Md., has taken over the goodwill, patterns, records and drawings of the *Universal Shot & Sand-Blast Manufacturing Co.,* of Hoboken, N. J.

Universal equipment, parts and supplies will now be manufactured by the Pangborn Corporation, who are equipped to serve all Universal users.

Robert E. Donnelly and *Frank C. Weber,* sole owners of the Universal business, are now associated with the Pangborn Corporation.

Brown Quarters at Pittsburgh

Due to the volume of business in the Pittsburgh district, the office of the *Brown Instrument Company* there has moved to larger quarters. It is now located at 1522 Oliver Building. While the former office was also located in the Oliver Building, the new quarters offer increased facilities for handling the new business.

INDUSTRIAL LITERATURE

Firebrick Bulletin

There are a number of interesting items to be found in the April issue of the "*Laclede-Christy Bulletin,*" published by *Laclede-Christy,* at St. Louis, Mo. All, of course, deal with the use and manufacture of firebrick. Among the items are a description and illustration of suspended air-cooled walls, another dealing in a broad way with cement manufacture, and numerous others.

C-E Stoker Publications

Changes in the design of the C-E multiple retort stoker are covered in a descriptive booklet known at *MR-1 and published* by the *Combustion Engineering Company.*

The C-E multiple retort stoker is designed to fill the need for an improved super-station type stoker.

Another new publication issuing from the same firm is a catalog illustrating and describing the Type K underfeed stoker.

This is a unit applicable to boilers up to 200 h.p. Its use with small boilers is suggested to secure the advantages of efficient mechanical stoking at a relatively low investment cost. The Type K stoker, according to the manufacturer, is mechanically simple and easy to operate, its general design and method of air distribution insuring efficient combustion over a fairly wide range of boiler ratings. Practically all grades of bituminous coal are readily burned on the unit, it is stated.

Du Pont Explosives Information

An excellent idea of the scope and detail of the service given in the past six years by the *Explosives Service Bulletin* is furnished by the March issue of this *E. I. du Pont de Nemours & Co., Inc.,* publication. The issue is comprised entirely of lists of information contained in those previously issued, grouped according to date of issue as well as according to class of work to which they are applicable.

Classifications under which subjects are listed are coal mining, quarrying, tunneling, general, and miscellaneous.

Traylor Service in 1928

Its service to the industry in 1928 is covered in a general way in a broadside just published by the *Traylor Engineering and Manufacturing Company,* Allentown, Pa.

Views and brief descriptions of a half-dozen products are also presented.

Gypsum

at Extremely

Low Prices

Stucco plaster, a by product in the Terra Cotta industry, can be supplied by thousands of tons annually in quantities desired—*and at a very low price.*

High SO_4

High SO_4 content makes the product highly desirable.

A Waste Product

It comes from moulds which are broken and discarded after use;—hence the low price.

Sold on Contract

Sold on contract f. o. b. our New Jersey plants, only. (Production of southern factory already contracted for.)

Atlantic Terra Cotta Company

Perth Amboy New Jersey

The Highest Cement Plant in the World

Situated at an elevation exactly twice that of the United States plant located at the greatest height above sea level, the Sociedad Boliviana de Cemento (Bolivian Cement Company) located in the Republic of Bolivia at an altitude of 14,500 ft., lays claim to being the highest cement plant in the world, according to a recent issue of "Cement and Cement Manufacture," published at London, England.

Concrete, in an article describing the plant of the Monolith Portland Midwest Company in the January, 1929, issue, stated that it is the highest cement plant in the United States, being located at an altitude of 7,200 ft.

The English article continues, "The plant, to produce cement by the dry process, was to have had a capacity of 6,000 bbls. per month, and it was estimated that the plant would be able to produce sufficient cement to fill Bolivian requirements at a price that would eliminate foreign cement altogether.

"The rock, clay and gypsum are crushed by a No. 6 McCully gyratory crusher and elevated to a three-compartment bin from which the rock and clay are drawn and mixed in the desired proportion in hopper scales. The mixture is then elevated and fed to an Allis-Chalmers 30 by 4 ft. dryer using crude oil fuel. From the dryer discharge the mixture is elevated to a bin which feeds a 6 by 15 ft. compeb mill. The powdered material is then elevated to a screw conveyor leading to a bin from which it passes to a feeder regulated by a Reeves' 'speeder.' It is then elevated to the spout leading to the kiln, which is 100 by 7 ft. This kiln is also oil fired.

"Power for the plant is provided by a Sulzer-Diesel four-cylinder four-cycle engine rated at 520 h.p. at sea level, but giving only 70 per cent of this h.p. at the altitude stated.

"The clinker is elevated from the clinker pit to the pile by means of a continuous bucket elevator set at an angle of 45 degrees. The operation of the plant is intermittent, with alternate periods of burning clinker and alternate periods of grinding. After grinding the clinker, the resulting cement is elevated and conveyed by means of a screw conveyor to four storage bins from which it is drawn through spouts for sacking by hand.

"The raw materials available for the manufacture of cement are excellent, and analyze as follows:

	Limestone, Per Cent	Clay, Per Cent
SiO_2	5.03	64.70
R_2O_3	0.61	23.65
CaO	53.57	1.20
MgO	0.71	1.93
SO_3	0.04	0.01
Loss in calcination	40.10	5.23

"Separation of the iron and alumina in the clay showed Al_2O_3 19.39 per cent and Fe_2O_3 4.26 per cent.

"When the plant commenced operations it was found that when the mix was passing through the dryer at least 80 per cent of the clay was carried off by the draft in the stack and this was corrected.

"The results obtained from this plant were not up to expectations, and were a disappointment to the Bolivians, who are keen to see the establishment of national industries in their country. Alterations are, however, being made in the plant, and it is to be hoped that these changes will result in success. The consumption of cement in Bolivia is not large but it is expanding, and should double itself in a very short time if the national factory can produce good cement at a reasonable cost."